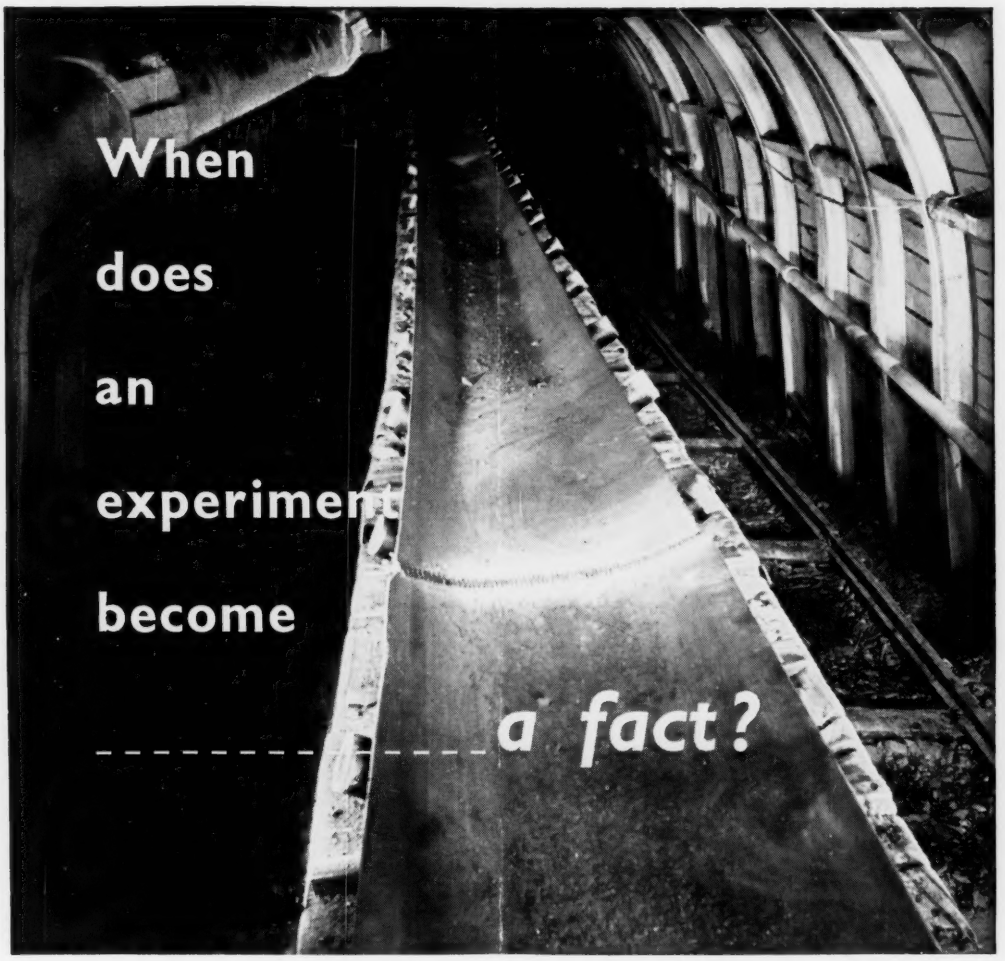
The Mining Journal

Established 1835 — Railway & Commercial Gazette

Vol. CCXLIII No. 6212 — LONDON, SEPTEMBER 10, 1954 — PRICE 8d.



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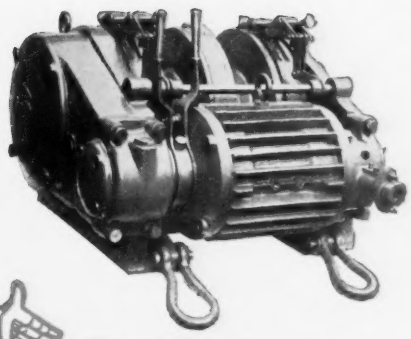
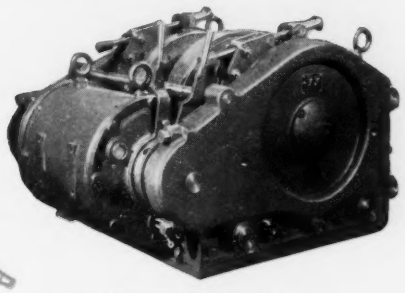
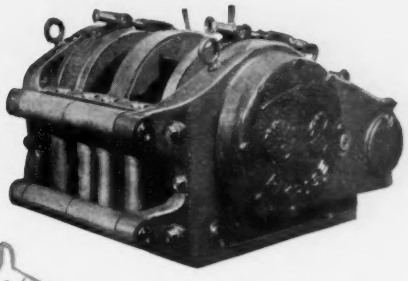


S.1. specification.
Width 31½". Height 21½". Back to front 35½". Drum capacity 410 ft. ⅝" diameter rope. Average rope speed 152 ft. per minute. Average rope pull 1,630 lbs. Horse-power of the motor 7½.

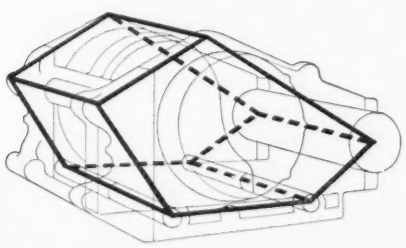


S.2. specification Electric A.C. drive.
Width 38½". Height 25½". Back to front 44". Drum capacity 310 ft. ½" diameter rope. Average rope speed 220 ft. per minute (1,000 r.p.m. motor). Average rope pull 2,500 lbs. Horse-power of the motor 15/25.

S.2A. This model is similar to model S2 except that it has a horse-power of 25/45 and a normal rope pull of 3,500 lbs. (6,700 lbs. overload).



S.3. specification Electric A.C. Drive
Width 48½". Height 34". Back to front 57½". Drum capacity 440 ft. ⅝" diameter rope. Average rope speed 22 ft. per minute (1,000 r.p.m. motor). Average rope pull 5,000 lbs. (8,600 lbs. overload).



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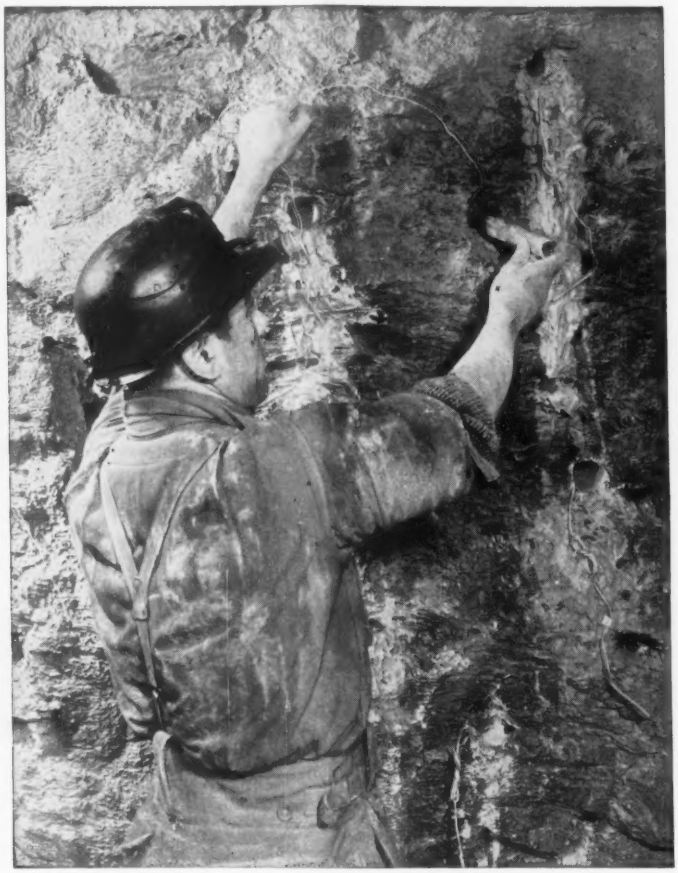

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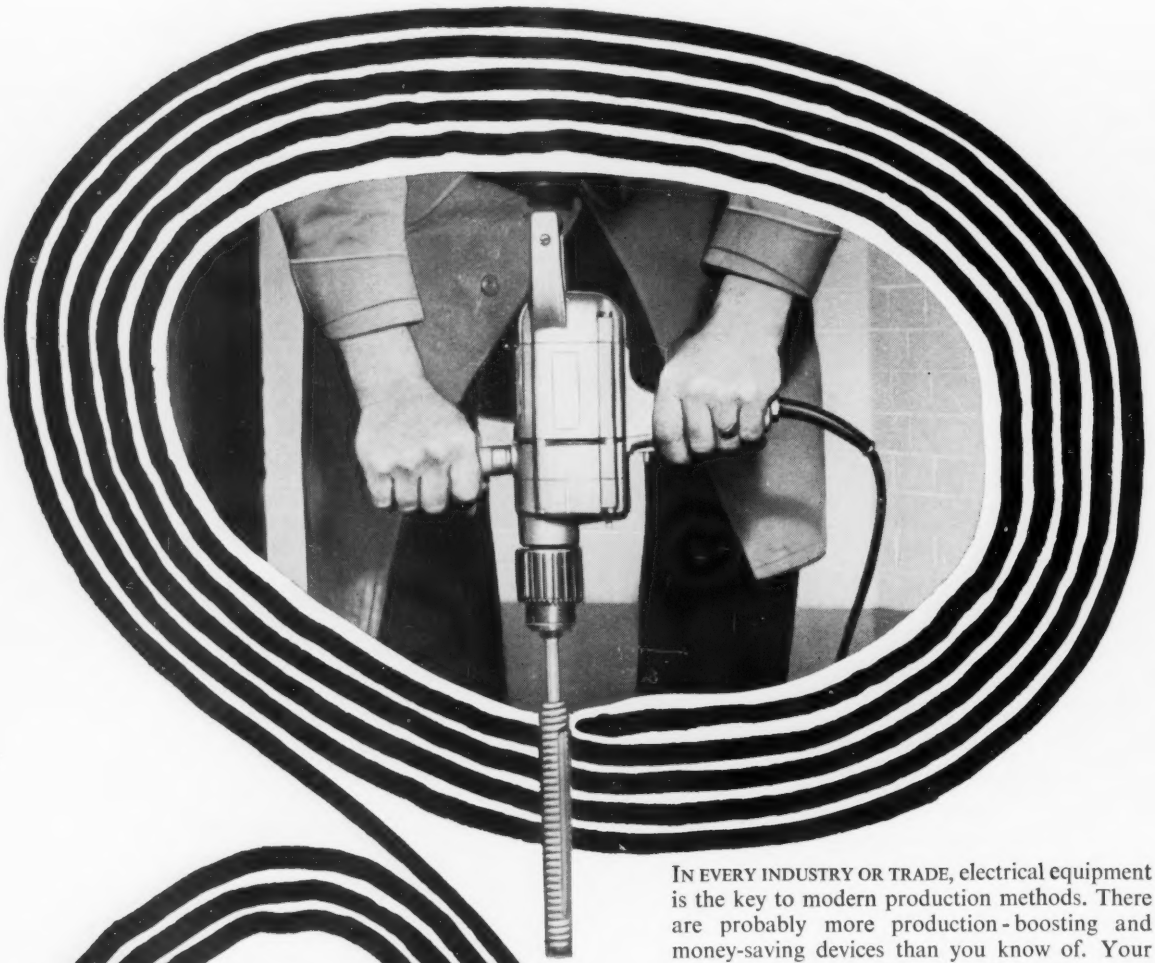

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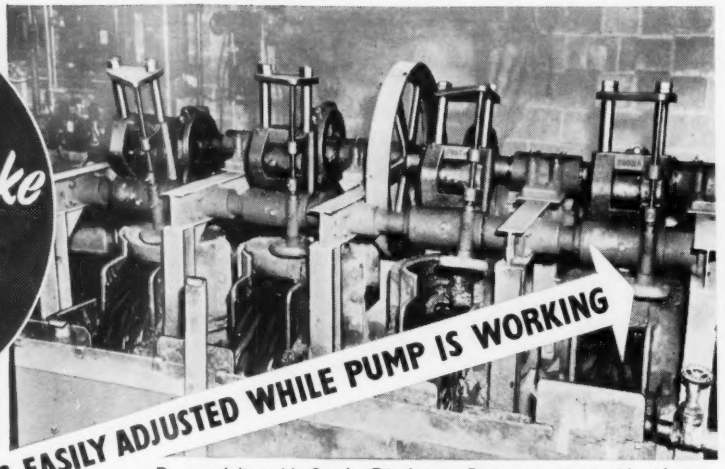

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Write for illustrated Bulletin P8-B7

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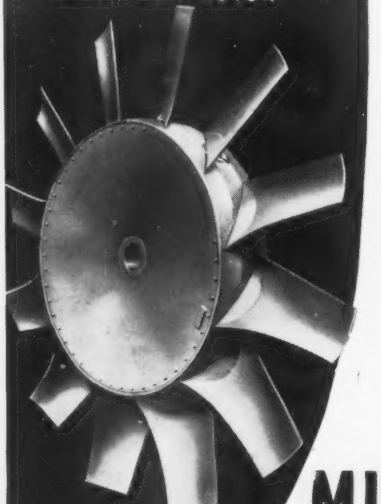

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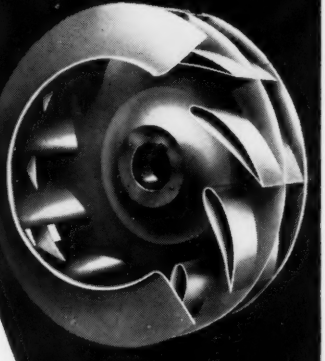

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NOTES AND COMMENTS

The Case For The Independent Consultant

The continued growth in the size and multiplicity of functions of the modern industrial unit is one of the characteristic features of the economies of the western world. Some would aver that this development is no more than the natural outcome of industry having to flex its muscles to shoulder the heavy burden of taxation, to bear the cost of expanding research activities and to remain competitive in world markets.

But whatever the reasons, it is inevitable that this expansion absorbs goods and services previously rendered by the smaller independent units. Indeed, in times of prosperity no less than in times of depression the truth of the old Tammany Hall saying, " If you can't beat 'em join 'em " is everywhere in evidence. And while the growth of these giant units seen against the very real background of high taxes, fluctuating prices and labour difficulties has received the blessing of both State and private enterprise it is axiomatic that in this growth the very real danger exists of the small independent professional consultant being gobbled up in the process.

For a somewhat different set of reasons and with somewhat different results the trend towards larger units has also taken place in the mining industry. That anomalies in the organizational structures and associations occur in this sector of the economy is, perhaps, a concomitant of the circumstances peculiar to the mining industry, working as it does wasting assets whilst facing the full force of supply and demand for the various minerals worked. Indeed, the development in the South African gold mining industry of the " group system " which provides for a fiexibility of control arrangements and working agreements inconceivable in commercial business undertakings is a striking case in point.

Broadly speaking, the growth of company units, whether industrial or mining, has left its mark on the independent professional consultant. While the extinction of the consulting mining engineer has been proceeding apace over the last 20 years, the independent consulting geologist has been given a new lease of life with the advent of geophysical techniques. In fact, *prima facie* evidence from the U.S.A. would lead one to believe that the numbers of independent consulting geologists are on the increase. But as Dr. D. M. Davidson pointed out in his presidential address in November last to the Society of Economic Geologists, this is an artificial condition brought about by the U.S. Government's Technical Assistance programme.

Apart from the growth of the mining company units which has led these companies to rely more and more on geological advice obtained from their own permanent staff of geologists, the independent professional consultant is also confronted with the incursion of governments into his sphere of activity. This mixed blessing has come about for a number of reasons, one of which has been the well meaning but dangerous concept that maximum efficiency can only be obtained by controlling, so far as is possible, the greatest number of variables in the cost-revenue equation; another reason is strategic considerations—often exaggerated and sometimes maintained for political expediency; while yet another has evolved out of initial aid granted for a project leading to its subsequent take-over once the project has been deemed an economic proposition. Nevertheless, there is little likelihood of governments retreating from their present position if only because the procurement of adequate supplies of minerals to-day plays such a large part in shaping industrial policies and in determining the scope and direction of military needs.

With the foregoing in mind it is most noteworthy that Dr. Davidson in his presidential address entitled " Human Relationships in Future Mineral Procurement," should have singled out the independent consulting geologist for comment. His remarks are all the more apposite as he does not speak as an independent consulting geologist but as the Vice-President of the Longyear Company, Minneapolis, U.S.A.

Dr. Davidson's central theme is that in the vital task ahead of the free world of procuring adequate mineral supplies to meet the demands of an ever expanding economy, attitudes will be more important than techniques and people more important than rocks. That being so, a crucial point in need of assessment by both governments and large mining companies is what value they should place on the building up of faith and goodwill in the pursuit of

their objectives. These are the well proven attributes of the independent geologist accustomed to the hurly-burly of inter-personal relationships gained over a wide range of situations and born out of experience in many different countries.

The true consulting geologist, Dr. Davidson declared, has contributed greatly in the past to our knowledge of ore deposits and to the enhancement of ore reserves. This achievement he ascribes to the fact that the best geologist is a hungry geologist. Hungry not only for material welfare but also for professional esteem and the opportunity for self expression. "There can be no quibble," he declared, "about the fact that a consultant is more hungry than his colleague who is sheltered in the security of a permanent job and looks forward to a pension. His imagination will be bolder and freer, the challenge to him is greater, and he will thus often respond in higher manner to this challenge than his permanently employed counterpart."

Nevertheless the status of the consultant to-day, he added, is not reassuring beset as he is by crippling taxation and relentless competition. In fact, Dr. Davidson goes so far as to state that only those who made their fortunes before the era of high taxation can now feel financially secure. He does, therefore, make a strong plea alike to governments and to companies to recognize that the independent professional is necessary to the health of the mineral industry and to make whatever contributions they can towards establishing a healthy climate in which the independent professional consultant may prosper. It should not be forgotten, he said, that it was the great consultants of the past who have made great contributions to science and mining geology in general. The wisdom disseminated by these men helped in meeting the demands of the second world war with regard to minerals and their ideas are still guiding forces in the present search for new discoveries of needed ore deposits.

Canadian Developments Attracts Capital Investment

The commencement of iron ore production from a large new field and the commencement of work on the St. Lawrence Seaway and power project are regarded in Canada as mammoth strides in the nation's industrial development, writes our Canadian correspondent. Add to this the rate of growth of the country's petroleum and natural gas industry, as well as the extent which developments in the uranium mining industry has reached, and the sinew is revealed around which industry in steadily growing magnitude may be expected to revolve. Add also the initial steps already taken toward plans for development of the great waterfalls of the Ungava district on the Eastern seaboard and a similar plan for the Yukon Territory on the Pacific, and there is evidence to indicate that a coming generation will probably write of events equally as great, if not greater, than those of which we report to-day.

During earlier periods of the march of the new country of the United States towards greatness, growth was measured to a considerable extent in terms of enterprises involving expenditures of tens of millions of dollars. Now, in this year 1954, Canada has many enterprises under development involving tens of millions of dollars—and a number involving hundreds of millions of dollars. This comparison is undoubtedly a factor in luring capital in increasing volume toward participation in the development of Canada—more than half a continent and with vast areas still virgin.

Although there are one or two greying clouds on the economic horizon these are no bigger than the proverbial man's fist and should be dispersed without undue difficulty. Indeed, even the gold mining industry is sharing in the current prosperity. This has come about largely through the plentiful supply of labour available, which has had a sobering influence among the workers at the gold mines. Efficiency is increasing and absenteeism is dwindling. As a result, gold producing enterprises are facing the future with increasing confidence. A more widespread distribution of the precious metal among the nations of the world is considered to be a symptom of a healthier outlook for the metal than was the case when the balance hung too heavily in the direction of the United States.

Gold and Uranium Expansion Strains Escom's Resources

Although the Electricity Supply Commission of South Africa made noteable progress with the installation of new plant to meet the ever increasing demand for electric power throughout the Union in 1953, the expansion of gold mining and the rapid development of the uranium industry together with the requirements of associated industries and local authorities placed a severe strain on the Commission's resources in general and on the Rand Undertaking in particular. Consequently, it has not been possible to relax retrictions on consumers' maximum demands in this area.

These facts have been made known in Escom's annual report for the year ended December 31 last, which also states that a reassessment of the requirements of the gold mining industry, including uranium production, for the next few years has revealed the urgent necessity for the provision of additional power, and steps have been taken to site and plan a new station.

During 1953, 9,441,977,327 units were generated in the Commission's power station and over 8,000,000 tons of coal were consumed. Total sales of electricity, steam and compressed air were 8,732,200,018 units, an increase of eight per cent over the total units sold in the preceding year Of the total sales the mines and industries, and the South African railways purchased nearly 80 per cent of the Commission's output.

The increased electricity charges effective last year, which were foreshadowed in Escom's annual report for 1952 offset the rising cost of coal and enabled the Commission to earn a small surplus of £931 compared with a loss of £418,282 in 1952. However, the report warns that it will be necessary to further increase tariffs when new plant under construction or on order, purchased at the high prices ruling at the time, is brought into commission.

Lack of Diamond Drills Holds Up Diamond Mining in Andhra State, India

After a preliminary investigation of Andhra State, India, the Indian Bureau of Mines has recommended a systematic search for volcanic plugs, the original source of diamonds in the area. Indeed, diamond mining was at one time a flourishing industry in Andhra, the method of recovery being similar to the manual system currently in use at Panna. In these operations the diamond bearing conglomerate was mined, crushed, washed and was spread out over even ground near the pits. The diamonds were then hand picked from these thinly-distributed stacks.

The systematic search now recommended by the Bureau arises from the realization that existing geological data of the Andhra region is insufficient and inaccurate. The possibilities of the discovery of diamond plugs both in the sedimentary area and in the adjoining granite cannot be overlooked. At the moment, the greatest drawback to the investigation is a lack of diamond drills without which progress is impossible, and at the time of writing our Indian correspondent states that efforts to secure these units from overseas sources have met with little success.

Brazil

(From Our Own Correspondent)

Teresopolis, August 9.

A discovery of manganese was reported in August from the Gorotire region, near the Fresco River, a tributary of the Upper Zingu. The Department of Mineral Production (D.N.P.M.) has received excellent specimens of pyrolusite, with high manganese content. The Gorotire region, formerly known as Novo Horizonte, is inhabited by Indians and can only be reached by air, or by river during the dry season. It is situated 800 kilometres from Cuiaba, in Mato Grosso, and is an outpost of the Indian Protection Service. The D.N.P.M. has recently been investigating the mineral resources of the district, which are believed to be valuable and to include coal.

Manganese is known to exist in the Amazon Basin, along the borders of Para, Amazonas and Mato Grosso. In southern Amazonas the reserves are estimated at 1,000,000 tons, at least. The D.N.P.M. also has particulars of occurrences on the Rivers Arapuana, south of Borba, Sucumburi and Tapajos. The first-named were worked during a brief period, producing high-grade mineral, but all these beds are situated in remote regions, of different access.

In July Mineraçao Bonfim S.A. was authorized to exploit a deposit of manganese in the municipality of Manicore, in Amazonas. Permits to exploit are only issued after prospecting has shown that the occurrence is likely to prove of economic value.

OTHER NEW MINERAL DEPOSITS

In June licence was granted to prospect for vermiculite in the municipality of Uba, Minas Geraes. This is believed to be the first reported occurrence of biotite mica in Brazil.

A deposit of beryllium, said to be important, has been discovered near Itambe, in Bahia. The owner has signed a contract with an American firm to work the mine, from which 300 tonnes were recently exported to U.S.A. An occurrence of columbite is being exploited in the same neighbourhood, the entire output going to U.S.A.

BERYLLIUM EXPORTS

A presidential decree, signed in June, fixes at 4,000 tonnes the annual export quota of beryllium in the form of primary concentrate, or the equivalent quantity of metallic beryllium in the case of industrialized products. The decree establishes the net price f.o.b. Brazil at U.S.$46 per unit of tenor in the metric tonne, 90 per cent to be paid against shipping documents.

The U.S. Bureau of Mineral Research estimates that world consumption of beryllium, of which Brazil is the chief source of supply, will double during the next 25 years. The American government plans to stock reserves and promote national production, but substantial imports will still be needed to meet the local demand, 65 per cent of which is earmarked for defensive purposes.

EXPLOITATION OF RADIOACTIVE MINERALS

The first plants for the treatment of uranium and production of metallic uranium to be employed in nuclear reactors will be installed in the Poços de Caldas region of Minas Geraes. Pilot plant will first be set up, in order to train specialists and produce sufficient uranium for experimental atomic reactors. Further development will be by gradual stages, within modest limits. Specimens of metallic uranium of the required purity have been obtained in France from mineral extracted from the Poços de Caldas reserves.

An occurrence of high-grade uranium has been confirmed at Barreiro de Araxa, Minas Geraes. The mineral is associated with uranium, thorium and niobium and is considered by Professor Djalma Guimaraes to be the most important deposit of radioactive minerals discovered to date in Brazil.

Proposed Expansion of Fijian Mining Industry

(From Our Own Correspondent)

Melbourne, August 30.

There is prospect of large expansion in the mining industry in the Fiji Islands. The two operating companies, Emperor Gold Mining Co. Ltd., and Loloma (Fiji) Gold Mines N.L., may consider a big development plan which will include deep underground work, for which prospects are considered good. The proposed work will require time, capital, and, probably, more labour than is available at the moment. The Emperor company has already proved important gold occurrences to the east of the present workings, and these lodes have both width and good gold content.

Stoping operations at the Emperor Mine. At right is seen crib sets of timber.

The activities of the companies may be expected to extend beyond gold and silver. Managanese is now being mined, and exports have totalled 2,186 tons of ore valued at £33,000. If further examination of the manganese occurrences warrants, the field may be developed in a large way. The new discoveries east of the Emperor mine will add substantially to Fijian gold production, when adequate treatment capacity is provided. Last year's export of gold was worth £993,000, and silver was valued at £5,000. Taxation of Fijian gold mining profits is adversely affecting the growth of the industry, with the result that both operating companies have adopted the policy of investing in Australian enterprises.

Operations at the Havelock Asbestos Mine, Swaziland

The Havelock asbestos mine, situated in the north-west of Swaziland, South Africa, is owned and operated by New Amianthus Mines (Proprietary) Limited, technical services being provided by African Associated Mines (Private) Limited. Several features of the mine, which are described in the following article, are of particular interest, namely the despatch of asbestos by bi-cable aerial ropeway over twelve miles of difficult terrain to the railhead, the use of sub-level stoping, and the fact that in 1948 the original quarrying activities were discontinued and underground mining was commenced.

In January, 1930, Havelock Mine was purchased by New Amianthus Mines (Pty.) Ltd. following satisfactory disclosures made during a nine months' development option. Unfavourable market conditions prevented the immediate exploitation of the property, but in June, 1936, when it became apparent that exhaustion of ore at Amianthus mine would lead to cessation of operations there within a few years, the decision was taken to develop and equip the Havelock mine for large-scale production. The first despatch of asbestos from the mine took place in June, 1939.

INACCESSIBLE TERRAIN

This rate of progress represents a notable achievement because although the Havelock mine is only 12½ miles distant in a direct line from the nearest rail-head at Barberton in the Eastern Transvaal, a mountain range intervenes and, initially, the mine was virtually inaccessible to ordinary forms of vehicular transport. A mountain road was constructed between the mine and Pigg's Peak, a distance of 12 miles, over very difficult terrain. Thence to Hectorspruit, a point on the railway connecting Johannesburg to the port of Lourenco Marques, an existing road had to be reconditioned over its entire length of 43 miles before transport of the necessary heavy items of machinery, plant and equipment could be undertaken. The mine area is one of exceptionally high precipitation, which aggravated difficulties. Annual rainfall figures of 80 to 90 in. are not uncommon, and in February, 1939, 24.34 in. were recorded. To overcome the potential difficulty of transporting the marketable asbestos product to rail, it was decided to construct a bi-cable aerial ropeway between the mine and Barberton and this work was successfully completed by October, 1938. The ropeway has an hourly capacity of nearly ten tons and its length is 12.6 miles. Pylons on which the ropes are supported vary in height from 15 ft. to 165 ft. Subsequent to the outbreak of the war in 1939 a 28-mile all-weather road was constructed connecting the mine to Barberton, a difficult feat of highway engineering.

THE GEOLOGICAL SYSTEM

The fibre-bearing serpentine ore is apple green in colour. The body of ore is enclosed in rocks of the Moodies Series of the Swaziland System. These are light-coloured, fine-grained argillaceous and arenaceous sediments in which occur zones of banded and sometimes ferruginous cherts. The cherts outcrop prominently in numerous ridges in a deeply weathered area.

The formation as a whole dips south at an angle of approximately 50 deg. from the horizontal. Conformably with this the ore body has a similar dip and in direction of strike it extends 4,500 ft. east and west with a true thickness of 150 ft. The hanging wall and footwall are not sharply defined and resolve into economic limits. In the footwall is a sheared almost black barren serpentine. Within the green massive serpentine ore body seams of chrysotile occur in the nature of stockworks.

The length of individual asbestos fibres varies from less than ⅛ in. up to 1½ in. and 2 in. The serpentine of the hanging wall is very dark green and is less sheared than that of the footwall. Not far distant from the ore body hanging wall is a granite-like dyke striking in a parallel direction and, as far as observations go, following the ore body in dip. Deeper into the footwall are chert layers between which and the footwall serpentine is a very disturbed zone over a width of from 60 to 100 ft., which is assumed to be a strike fault.

INCLINE SHAFT MINING

The mine has been developed from an inclined shaft dipping south of 40 deg. There are two hoisting compartments in which ore is hauled in 5-ton skips, and a pipe and ladderway compartment. The depth of shaft on incline is 1,280 ft. from the collar, the bottom being 25 ft. below fifth level.

Quarrying, which provided the bulk of the mill ore initially, was discontinued in 1948, giving way to underground mining operations. The ore body has been developed, on third level and above, to its extreme eastern and western limits and stoping is retreating from these extremities towards the main shaft pillar. At convenient intervals on strike, service and rock raises are devoloped well in the footwall.

The service raises are equipped with a ladderway, ventilation, compressed air and water pipes and a skip. They constitute the travelling ways to sub-levels and provide means of handling equipment. The rock raises are used during the sub-level development period of the stoping block or blocks in their vicinity.

SUB-LEVEL STOPING

Three methods of sub-level stoping have been tried the first of which, of strike retreat, has been discontinued. In it a slot is cut across the ore body from footwall to hanging wall and parallel slices are taken across the body retreating along the strike.

The other two methods are similar to each other, in one the slot is cut in the hanging wall and extends for the full length, on strike, of the block to be stoped, slices are taken by retreating towards the footwall; in the other method the direction of retreat is towards the hanging wall from a slot cut along the footwall.

Generally speaking, the western portion of the ore body is more fractured or sheared than the eastern and does not stand so well. This circumstance has led to the adoption, on the eastern side, of the hanging wall to footwall retreat method and on the western side, the footwall to hanging wall retreat. In the latter blocks, once the cave has been initiated from the original slot, it is seldom necessary to blast rings on the sub-levels other than those necessary to extend the footwall slot. On the eastern side the stronger standing ground entails blasting of rings on all sub-levels.

The sub-levels are developed at 30 ft. vertical intervals.

The lowest sub-level, that which is immediately above the main tramming level, is the grizzley sub-level where the broken ore is drawn from the stope through draw-points on to grizzleys constructed over ore passes from which the ore is loaded into trucks on the tramming level.

Dimensions of a typical stoping block on the eastern side between first and third levels are 400 ft. on strike and a vertical interval of 217 ft.; six sub-levels being spaced at 31 ft. intervals. On each sub-level footwall and hanging wall drives are developed which are connected by crosscuts spaced at 60 ft. intervals. The footwall drive is located approximately 30 ft. in the footwall of the ore body and is so placed to permit the footwall of the stope to be steepened if required to draw off ore which might otherwise be lost. The hanging wall drive is placed within the ore body about 50 ft. from the hanging wall limit of ore. Ore passes from the grizzley level are spaced at 60 ft. intervals in the crosscuts and each receives ore from two drawpoints (four drawpoints in the earlier practice).

ROCK BREAKING

Blast holes are drilled from the hanging wall drive to the approximate hanging wall limit of ore and, in direction, from the horizontal to the vertical, while in the crosscuts the so-called " ring drilling " east and west is also from the horizontal to the vertical up to the next sub-level above. The ring drilling from each crosscut covers an area 30 ft. on either side of the crosscut to a height of 30 ft.

Glass models are prepared for each stope block, each sub-level being correctly positioned, and all drives and crosscuts are depicted. Each ring of holes drilled is accurately shown. Constant reference to the glass models as stoping progresses is necessary to exercise the necessary control and obviate undercutting upper sub-levels.

Rotary drills are employed in ring drilling. They are fitted with blast hole feed end coupling adapters to take 24 in. EX extension rods and couplings. Tungsten carbide crowns are used in conjunction with a crown adapter. Drilling rates are rapid, up to 24 in. per min. and a sequence of operations has been evolved to ensure maximum drilling time during the shift. Under favourable conditions a crew can drill up to 460 ft. of 1⅝ in. or 1¾ in. hole per 8-hr. shift. Crown life averages 4,000 ft. A specially designed brass protractor is used to lay out the drill hole pattern accurately and ensure the toe burden does not exceed 6 ft.

Blasting with millisecond electric detonators had to be abandoned in favour of cordtex-fuse blasting because of contamination of the bagged graded asbestos with copper wires.

TRAMMING OPERATIONS

On third level, ventilation drives are developed between the hanging wall, mid and footwall tramming drives and from them raises, about 3 ft. square in section, are put up to the grizzley sub-levels to hole between two grizzley points. These raises can be brought into operation at will by means of adjustable flaps to ensure the rapid removal of fumes from any drawpoint area following secondary blasting.

Transport of ore on the main tramming levels has undergone a process of evolution from hand tramming in 16 cu. ft. U-V side-tipping cars, to endless rope haulage and belt conveyor systems. Granby type cars with storage battery electric locomotives are under consideration for future ore transport installations. The whole of the mine from third level and above is drained by means of a 3,496 ft. drainage adit.

ORE TREATMENT

Milling practice has undergone continual modification to achieve the following objectives:

(a) labour saving;
(b) improved extraction of chrysotile from mill ore;
(c) improved bagged fibre quality.

An initial sizing segregation takes place for the purpose of drying the wet ore below 2½ in. ring and crushing the coarse ore to this limit. Drying takes place in tower dryers down which the material showers is a direction opposed to the hot flue gases. Depending upon the degree of moisture in the mill feed, drying can be done in two tower dryers in parallel or in series. The moisture content of the dried ore is subject to control.

The customary method is employed of separation of fibre released in each stage of crushing by means of vacuum nozzles suitably adjusted in respect of air pressure and distance from the prepared crushed ore system.

Crushing is performed in stages, initial reduction of coarse elements taking place in jaw crushers followed in succession by cone crushers and two types of impact mill. In one of these the hammers are mounted on a horizontally disposed shaft, and in the second, the shaft is vertical.

Screening apparatus in use in conjunction with stage crushing and air separation comprises trommels and flat screens to which an appropriate oscillatory motion has been imparted. The screening medium is steel wire cloth with square mesh apertures.

Two fan systems are employed, one for the separation of asbestos from rock and the other to prevent contamination of the mill atmosphere with dust. Both fan systems discharge into filters of the fabric tube variety which deposit dust and obviate pollution of the atmosphere in the vicinity of the mills.

Extensive use is made within the mills of belt conveyors, including final discharge of the waste discard to dump and a substantial saving in labour is thereby effected. Bagging of the graded fibres is also done mechanically. Four standard fibre grades are prepared, bagged in hessian bags of 1̄25 lb. net weight each under the bag marks HVL/24, HVL/3, HVL/4 and HVL/5.

Over 400,000 tons of asbestos have been produced since commencement of operations in 1939, resulting from the mining of 10,000,000 tons of ore and removal of 3,500,000 tons of overburden in the quarrying stages of exploitation.

POWER SUPPLY

In June, 1953, a new power station was commissioned replacing the original diesel-electric power generating installation. The new plant comprises a 4,000 kW. turbo-alternator with two water tube boilers with mechanical stokers, superheaters, feed heaters, surface condensing plant and economizers. The turbine is supplied with steam at a pressure of 400 lb. p.s.i. and a temperature of 760 deg. F. Each boiler is capable of evaporating 26,000 lb. of water per hr. under normal working conditions.

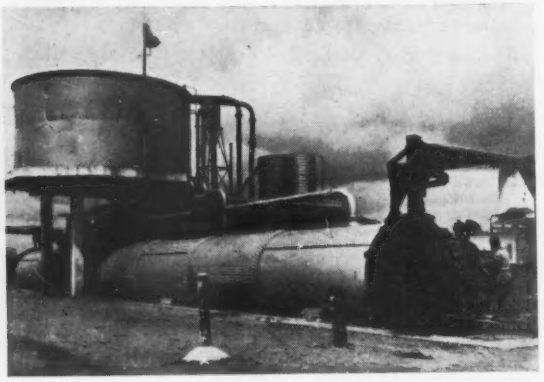
To maintain power supply during routine inspection and maintenance periods and for general emergency purposes a six-cylinder diesel engine with 600 kW. alternator is provided.

Accommodation has been provided for 154 European employees and 2,350 African employees and their families and health services are in the care of a full-time Medical Officer.

Maintenance and Protection of Mine Timber

The value of timber treated to prevent or reduce fungal decay and fire is becoming increasingly recognized in the mining industry. Research conducted in many countries on the problem of maintaining mine timber in the face of these natural hazards is being vigorously pursued, particularly in Australia by the Commonwealth Scientific and Industrial Research Organization and in South Africa by the Transvaal and Orange Free State Chamber of Mines. The main weaknesses of timber as a medium of underground support are its susceptibility to decay and its high combustibility, while the advantages include its high strength-to-weight ratio and the ease with which it can be worked on site. The following article elaborates these points and describes methods of impregnation as well as presenting the results of some recent experiments.

While the most satisfactory method of preserving mine timber from fungal decay and fire is undoubtedly by vacuum-pressure impregnation, treatment by this means involves the use of expensive capital equipment.



A vacuum and pressure impregnation cylinder operated by Hickson's Timber Impregation Co. (S.A.) Ltd. near Johannesburg

A good substitute is the hot and cold open tank method of treatment, which is used on a comparatively large scale in newly developed mining areas.

Although the quality and uniformity of this type of treatment cannot be compared with that given by vacuum-pressure impregation, it is possible to increase the timber's serviceable life to a useful extent by this method. Hot and cold soaking is simple and cheap, and as a mine develops it is usual to replace this plant with a vacuum-pressure unit having a capacity of from one to three standards of timber. In more concentrated mining areas the needs of several mines are often supplied by a larger centrally situated pressure plant, as for example the one at Roodepoort in the Transvaal, which supplies treated timber to many of the gold mines in the Johannesburg area.

In the United States many mines receive their timber by a similar method of distribution, and in the United Kingdom there are treatment plants situated at all the main pitwood ports and, in addition, a number of pressure plants have been installed at inland areas. As a result the National Coal Board is able to obtain vacuum-pressure impregnated timber from more than a dozen plants situated conveniently near mining areas.

DECAY IN MINE TIMBER

To develop decay in mine timber a supply of oxygen is required, together with a normal temperature range and plenty of moisture. The first requirement, namely, the supply of oxygen, is fulfilled by a mine ventilation system, while the need for normal temperature is generally supplied by standard underground conditions. The third requirement, that of the need for moisture, is one which varies considerably from mine to mine and is the chief explanation for the difference of the prevalence of decay in mines.

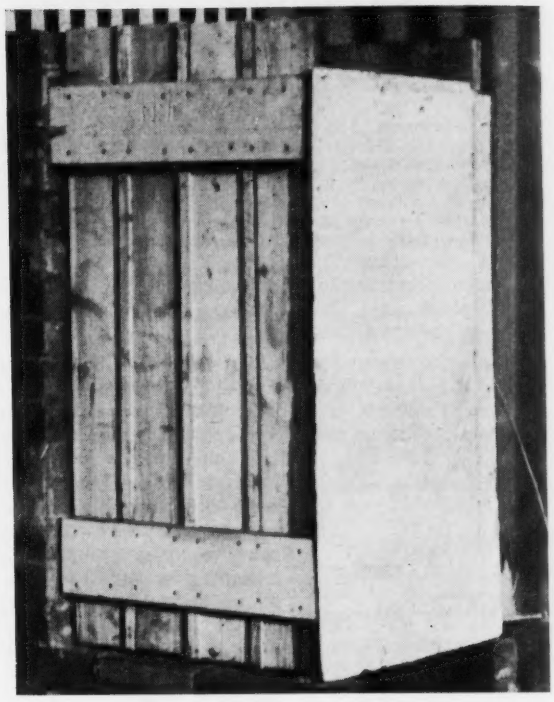
It is interesting that although in actively wet mines timber decays rapidly, this active deterioration does not take place more rapidly than in many mines which appear to be reasonably dry. The reason for this is that the air circulated to ventilate the mine is usually moist, with a humidity high enough to raise the moisture content of the timber to the point at which fungal spores will germinate. The moisture in mine air can come from the outside atmosphere, wet seams, perspiration of workers, compressed air lines or water sprays to combat the dust factor, but whatever its source of origin the air tends to be particularly moist in the return airways.

USE OF PRESERVATIVE CHEMICALS

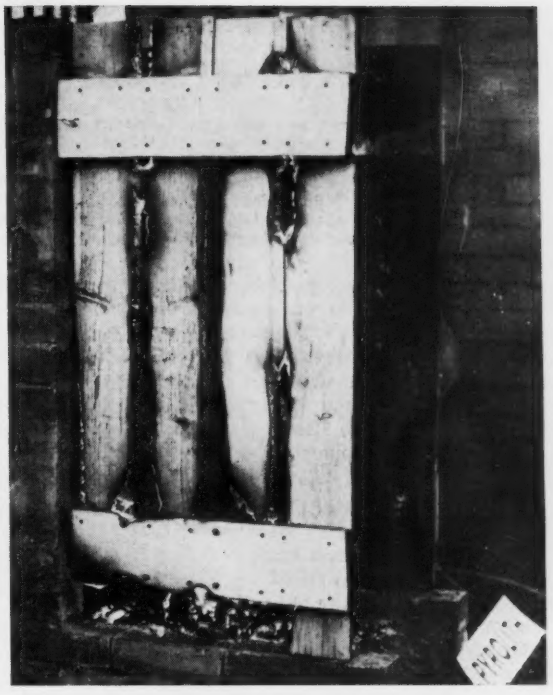
The most prevalent types of decay in mining timbers are caused by the fungi *Poria vaporaria* and *Coniophora cerebella,* though many other species are found. There are available a number of chemical preservatives which make the timber poisonous to these forms of life. Some of them, like "Tanalith" have a slight flame retardant effect and so are suited to use underground.

A revealing test as to the effect of timber decay has recently been concluded at Woolmet Colliery, where in 1930 the Forest Products Research Laboratory installed timber

Props impregnated with Wolman salts after 20 years of underground service side by side with untreated props



The untreated door prior to the test



The untreated door after one hour

props treated with Wolman salts side by side in pairs with untreated supports. When the timbers were examined in 1950, the treated props were still sound and were supporting the roof. Inspections carried out during the early years of the test showed that the untreated timber had decayed and had lost their load-carrying capacity within two years.

PREVENTION OF FIRE

As one of the effects of decay is to make timber much more inflammable and it has been shown that decayed timber ignites at a temperature 100 deg. C. lower than sound timber, preservation with a suitable toxic material can indirectly reduce the fire hazard and this acts as an additional advantage to the other benefits of chemical preservatives. It should be noted that the prevalence of the fungus *Poria* in mines makes it important to select a preservative which has long term toxicity to its attack. Preservatives which give excellent results in every other field can fail in underground use because of *Poria*.

For genuine fire protection a very different chemical agent is required, though an anti-fungi preservative can be incorporated in its formulation. Such a combined fire proofing/preserving material is "Pyrolith," which acts as a fire retardent in a complex and diverse way. Provided the timber is of fairly large dimensions it can be relied upon to maintain much of its strength even after prolonged exposure to flames. It is unlikely to flame itself, at any rate until some outside agency breaks away the charcoal protection.

This was well revealed in a recent test of the inflammability of timber impregnated with Pyrolith, when a brick furnace was built in which a coke fire was lighted capable of giving a temperature of 500 deg. C. at the commencement of the test. Two doors, one of untreated and the other of treated timber and both dried to the same M.C. were fixed on either side of the furnace, and thermocouples were fitted at top and bottom of them to record temperature range as it applied throughout the test.

During the test the intensity of the fire was increased by natural flue draught, and temperatures ranged from 500 deg. C. to 850 deg. C. at the base of the doors and 80 deg. C. to 475 deg. C. at the top.

After 15 min. the untreated door was penetrated by fire action and was badly charred and flaming in places. By the time 30 min. of treatment had been completed this door was penetrated to such an extent that in service flames would have passed through it. The treated door, on the other hand, was still functioning as a flame break after the test had been continued for one hour, and although it was charred it had not been penetrated and no flaming occurred even on the inside.

THE PROCESS OF REACTION

Although the exact mechanism of protection has not yet been fully investigated, it would seem that when a piece of timber impregnated with Pyrolith is subjected to high temperatures the Pyrolith salts are eventually converted to a treacly substance which seals wood pores and shuts out oxygen, and eventually to a phosphate glass which in its turn provides on even more effective seal against the oxygen necessary to burning.

Timber treated in this way is very useful mining material and although the cost of treatment adds about 80 per cent to the cost of the timber and probably prohibits its use for general mining work, there are many situations underground where the cost of treatment is well repayed by the security offered. Examples of such situations are shaft timbers, timber used underground near shafts, ventilation doors, timbers used at loading points or near electrical installations, particularly near the more dangerous parts of conveyors. The fact that Pyrolith contains a toxic preservative is important, for fungal spores are ever-present whilst fire strikes only occasionally.

Prospects for Tin Mining in Kuala Selangor and Rasa, Malaya

In *Memoir No. 7* of the new series published by the Geological Survey Department, Federation of Malaya, and entitled *The Geology and Mineral Resources of the Neighbourhood of Kuala Selangor, and Rasa, Selangor,* interesting remarks on the future of tin mining in the area emphasize the maintained production of alluvial river deposits which currently constitute the major source of Malayan tin. The areas covered by the *Memoir* were selected for detailed survey by E. S. Willbourn, formerly director of Geological Survey in Malaya, and the publication which has been prepared as a result of this survey has been compiled by Dr. F. W. Rhoe, Ph.D. B.Sc., former geologist on the staff of the Geological Survey Department. Particular interest attaches to the survey because of the opportunities to resume prospecting which has been virtually at a standstill for the past twenty years.

The actual and potential tin bearing areas of Kuala Selangor and Rasa, Malaya, are situated in that portion of North Selangor extending between latitude 3 deg. 30′ N. to 3 deg. 15′ N. and longitude 101 deg. 15′ E. to 101 deg. 45′ E. an area of approximately 585 sq. miles. Tin production in this district is currently being won from alluvial deposits in the river valleys, although lode deposits of low grade ore occur in the mountains.

The future prospects of tin-ore mining in this district are relatively good in so far as potential tin resources are concerned, and it is estimated in the *Memoir* that the production of alluvial tin will probably return to approximately the 1940 output of about 100,000 piculs per annum. The ground now being exploited averages 0.4 katis per cu. yd. although indications are that the industry will be called upon to work deposits of increasingly low grade.

It is not anticipated that there will be any change in the source of the mass of the tin ore produced in the district for several years. The ore will continue to be won from the alluvium of several rivers and their tributaries. Additional deposits of tin ore may be found under the coast alluvium west of a line extending north to south through Batang Berjuntai, where low grade deposits have already been proved below 75 ft. depth. Although Berjuntai Tin Dredging, which produced 173¾ l.tons of tin concentrates in the quarter May-July of this year, is the only operator producing tin ore from this source at present, prospecting has shown workable low grade ore west and north-west of the property while traces have been found in the coastal area.

Production from the coastal deposits will probably increase in the future and a significant feature is that in places the bedrock is limestone and schist cut by granite intrusions. As most alluvial and lode tin deposits elsewhere in Malaya occur in association with these rocks, it is considered possible that tin-bearing intrusions may exist on the coastal area in addition to the alluvial deposits. It must be borne in mind, however, that the entire area covered by coastal deposits does not contain workable ore, and present indications are that tin ore rich enough to warrant economic exploitation will be limited to only a fraction of the area. There is an urgent need for prospecting along the coastal districts.

The need for general prospecting may aid in the working of alluvial ore deposits in the mountains for not only are these deposits themselves a source of tin, but their removal is the only economic method yet found of prospecting for the underlying tin-bearing intrusions. When these ores were originally mined, the majority of tin was won from the alluvium by washing with water in a method of working known as "lampan" mining. So far lampan mining has proved to be the only economic method of exploiting these widely spaced and low grade deposits. One result of the lampan operations, however, was that large quantities of spoil entered the rivers and aggravated silting, and this method of mining was prohibited in the mountains after 1933.

The Malay Peninsular, showing the position of the Kuala Selangor and Rasa areas

Yet notwithstanding the potentialities of the lode deposits of the hills and the proved occurrences of the coastal area, the main source of tin in Kuala Selangor and Rasa remains the alluvial river deposits. The Selangor valley contains the largest area of tin-bearing river alluvium in the districts surveyed, and deposits extend for approximately 25 miles from Rasa near the mountains to the commencement of the coastal plains at Rantau Panjang. Rich ore has been limited to the Rasa area while the westerly deposits in swampy ground are considered to be of comparatively low grade.

Prospecting in this valley during the last 25 years has shown values averaging 0.25 katis of tin ore per cu. yd., and varying from 0.16 katis tin per cu. yd. to patches containing as much as 0.55 katis.

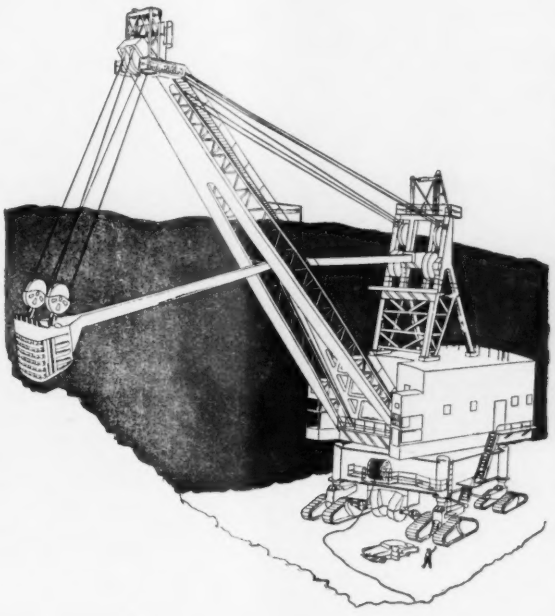
Much of the field work dealt with in the *Memoir* was carried out during 1940 and 1941, but owing to the Japanese occupation most of the detailed field notes and records were lost. A further brief survey carried out during 1948 was locally successful, but could not be completed as some of the more inaccessible portions of the area could not be re-examined owing to the activities of bandit forces.

Giant Excavator for Open Cast Mining Incorporates New Features

The armour plate steels produced during the second world war were extensively used in 1945 by the Marion Power Company, United States, in the construction of its excavating machinery.

The use of lighter and stronger steel materials allowed a wider scope of design and this, together with the knee action handle method of construction developed by the company in 1940, led to a design which shifted the weight of the heavy crowd machinery from the boom of the excavator to a point on the gantry near the centre of rotation. With this basic blueprint, and aided by the increased weight-to-strength ratio resulting from the use of lighter metals, the company was enabled to build excavating equipment with a bucket capacity of as much as 45 cu. yd. In fact, the company has at present no less than 16 excavators with buckets of 45 cu. yd. currently working in various parts of the United States.

A small indication of the size and potential capacity of American excavating equipment of this type was given in the United Kingdom in 1950, when one of the company's dragline excavators, designed to remove a top spoil, 80 ft. was imported for operations on the Southern iron ore strip mines of the United Coke and Chemicals Company at Scunthorpe. Designated the Marion 7400, this unit was equipped with a 12 cu. yd. bucket and was described in *The Mining Journal* of March 24, 1950. It was imported and assembled by John Blackwood Hodge and Company, who are the distributors of all Marion excavators in the United Kingdom.



An impression of the giant stripping unit under construction by Marion Power Shovel Co., U.S.A.

The working weight of the Marion 7400 was about 530 tons, including 98 tons of ballast. This weight rested on a base with an outer dia. of 31 ft., giving a total bearing area of 555 sq. ft. The excavator moved on walking tractor shoes, each 6 ft. wide and 36 ft. 6 in. in length. The surface area of both shoes together thus amounted to 438 sq. ft., and the excavator moved forward in steps of 6 ft. 2 in., at a speed of 0.15 m.p.h.

While initial advances in the construction and employment of such large stripping shovels were more marked in the United States where open cast mining operations are on a sufficiently large scale to warrant their employment, the United Kingdom achieved a prominence in this field in 1951 with the construction of the W1400 walking dragline by Ransomes and Rapier for Stewarts and Lloyds. At the time it commenced work at the company's iron ore beds at Corby, Northamptonshire, this unit was described as the largest walking dragline in the world. At Corby, 100 ft. of overburden covers the iron ore deposits and the W1400 moves 27 tons of spoil at a single bucket insertion.

In so far as the W1400 is concerned, the creation of a tubular jib 282 ft. in length was at that time considerably in advance of anything in existence, but Stewarts and Lloyds agreed to make the necessary steel and from it the tubes for the jib. The design was evolved by Tubewrights Ltd., a subsidiary of Stewarts and Lloyds, in collaboration with Ransomes and Rapier. The main compression and tension boom members were designed as twin tubes with distance pieces welded in, and the twin tube system was also used in planning the "A" frame.

It now appears that the initiative in this field of engineering has once more passed to the United States manufacturers, and the most recent giant excavating machine under construction by the Marion Power Company is a coal stripping shovel for the Hanna Coal Company division of Pittsburgh Consolidation Coal Company.

In this new unit, now under construction, the bucket capacity has been substantially increased over all previous units, and although the design of bucket is not yet finalized, it is expected that its bucket capacity will be almost 60 cu. yd. The machine will thus be able to remove, at each bite, overburden of up to 100 tons. The significance of the unit is therefore apparent when comparing earth-moving capacities with those of its predecessors. When the new unit is constructed it is estimated that it will be 100 times as large as the usual power shovel normally used on building projects, this claim being based on calculations centred on a shovel weighing 50,000 lb. of 1 yd. dipper capacity.

The new Marion giant has been ordered to facilitate excavation operations at coal seams lying approximately 90 ft. below surface, and it is envisaged as a spoil remover for the clearance of these seams. Operations are planned to commence immediately after construction is completed in 1955.

Dimensional specifications give some indication of the size of the new excavator, the weight of which will be 5,000,000 lb. including 1,000,000 lb. of ballast. Its eight crawler treads will be mounted in pairs, each measuring 8 ft. in height, 22 ft. in length and 54 in. in tread width. From ground level to the top of its boom point the shovel will rise 145 ft. and the unit will be powered by 16 motors developing a total of 4,500 h.p.

The size of the excavator allows the novel feature to be incorporated of an elevator to operate in the 6 ft. dia. hollow centre pin of the structure to transport either 1,000 lb. of freight or three passengers to the control deck.

MACHINERY AND EQUIPMENT

Further Acceptance of Roof Bolting in Metal Mines

The practice of roof bolting has been the subject of extensive tests at nickel mines of The International Company of Canada in the Sudbury district of Ontario. In these mines hard jointed rock is encountered, and roof bolts are primarily used to lock

Roof bolts in a cut and fill stope at Inco's Garson Mine

individual blocks into a self-supporting arch in the same basic method as has been used for some time in coal mining.

The findings of Inco engineers re-emphasize what has already been learned about roof bolting in other metalliferous mining fields of the world. The main factors, of course, have been mentioned in articles on the subject published in previous issues of *The Mining Journal*, and are that attention must be paid to size of hole, size and shape of wedge, and method of driving home the bolt in order to obtain maximum anchorage. Bolts used at Sudbury are 1 in. in diameter and 6 ft. long, located at a maximum spacing of 5 ft.

Uninterrupted Haulage for Continuous Miners

An extensible belt conveyor, designated ExB is described by the manufacturers, Joy Manufacturing Company, America, as a continuous haulage system for continuous miners in driving rooms and entries to 1,000 ft., including breakthroughs and pillar extraction. The system provides uninterrupted coal transportation.

The ExB uses only three motors and consists of two main units—a driving section and a tail section. A portable Joy limberoller idler system supports the belt between these two units. Available in belt widths of 24 in., 30 in., and 36 in. the system extends or retracts 50 ft. while operating under full load. New sections of belt 100 ft. in length may be added to permit each 50 ft. advance. The system is in reality the first production model of the Joy extensible belt conveyor, first shown in 1953, with the addition of a newbridge conveyor. This bridge conveyor is a flexible connecting link between the ExB and the miner.

The new system comprises two main units, namely a crawler mounted driving section with a tandem drive and multiple loop take-up with a storage capacity of 100 ft. of belt, and a tail section, also crawler mounted, that moves with the miner and extends the conveyor.

The bridge conveyor has a self-powered belt-drive and is flexibly suspended from the discharge end of the miner to permit a swing of 75 deg. to either side, and is flexibly supported on its discharge end by a track-mounted carriage with 10 ft. travel on the tail section of the ExB to permit a similar 75 deg. swing and a telescoping action at this point. By this means the bridge conveyor is automatically positioned between the continuous flow.

Fire Cements in Metallurgical Furnace Construction

The vast majority of furnaces are built of firebricks jointed with an appropriate fire cement, and among the non-ferrous metal melting furnaces used in the mining industry are those units constructed of firebricks bonded with Aluma fire cement. This material forms part of the range of fire cements manufactured by J. H. Sankey and Son Ltd.

Included in this range of products is Pyruma fire cement, suitable for use in the construction of kilns, which withstands intense and intermittent heat up to approximately 1,580 deg. C. The plastic fire cement named Aluma is a bonding with a minimum 50 per cent alumina content which withstands very high and intermittent temperatures up to 1,800 deg. C. and is of particular importance where molten metals are encountered.

Finally, Siluma is used for coke oven walls, among other applications, and has high refractory properties.

Fiat 25 CI Fitted With Diesel Engine

A more powerful version of the Fiat crawler tractor, Model 25 CI is now available on the British market through Mackay Industrial Equipment Ltd. This tractor, formerly fitted with a petrol/paraffin engine, is now supplied fitted with a Fiat diesel engine. This engine has 3.22 in. (82 mm.) bore, a 3.54 in. (90 mm.) stroke, and a capacity of 1,901 c.c. The compression ratio is 20:1, and the 4 cylinder 4 stroke engine develops 25 h.p. at 2,000 r.p.m. Fuel consumption is 0.42 lb. per brake h.p. hour.

A conventional forced feed lubrication system is used. A submerged pump in the sump draws oil through a filter and

The Fiat 25 CI fitted with diesel engine

passes it to the oil galleries. A pressure relief valve is fitted in an accessible position so that the oil pressure can be adjusted if necessary. The capacity of the system is 11.8 pints.

This engine gives a belt h.p. of 24, a drawbar h.p. of 20 and the following speeds from 1.1 m.p.h. (pull 4,500 lb.) to 4.5 m.p.h. (pull 1,725 lb).

METALS, MINERALS AND ALLOYS

COPPER.—On balance the strike situation in the Americas has deteriorated in the past week. In the States the settlement of the Kennecott dispute on September 1 has not, as anticipated, been followed by a similar agreement being reached between Anaconda and the Mine-Mill union, while last Wednesday negotiations broke down between Phelps Dodge and Mine-Mill, with the result that the former's El Paso refinery was closed down by the Union. The fact that only one-cent an hour separated the company's most recent offer and the Union demands for an eight-cent "package" would seem to provide further evidence that this Union is motivated as much by political as by economic considerations. The El Paso plant has been producing about 20,000 tons of refined copper per month. Also closed are the mines of the Miami Copper and of Inspiration Consolidated Copper, which together produced about 6,500 tons monthly.

In Chile, the El Teniente strike continues, but so far the sympathy strikes at Chuquicamata and Potrerillos have not eventuated. These were originaliy fixed for September 6 but, possibly due to the hint that the Chilean Government was considering action against leaders of illegal strikes, the strike deadline was subsequently deferred to September 9. It may also be significant that the Government is reported to have ordered investigation to reveal "foreign influence". It is certainly a coincidence to say the least that the Communist led Mine-Mill Union also and the Chilean Miners, among whom Communist influence is strong, should be conducting strike operations simultaneously. As we go to press we have no information as to whether these further strikes have materialised.

A fortnight ago we suggested in this column that if the Chilean Government should prove to be the first party to feel the economic strain of the strikes, the American copper companies should find themselves in a strong position to negotiate further concessions in the "new deal" legislation now under discussion. In this connection it is therefore significant that the Chilean Government was reported, at the end of last week, to be surveying the possibility of altering the exchange rate of the peso for the copper companies as a means of enabling them to meet the miners' wage demands. This step was apparently envisaged merely as stop gap action until the legislation has been passed, but it is difficult to see how the Government can avoid writing the same additional measure of relief into the permanent agreement once the principle has been established.

The Chilean Institute of Engineers has now submitted to the Minister of Mines, at his request, proposals regarding the precise duties of the proposed new Copper Institute or Corporation, which is to take over the Central Bank's copper functions. Briefly, the proposals envisage the establishment of a supervisory body with powers of direct interference in "exceptional" matters, such as problems relating to the opening up of new markets or the development of external influences making it difficult for the Chilean trade to operate. The report is opposed to the establishment of any monopoly as likely to discourage foreign capital for future development and considers it necessary to allow the producing companies to sell "because they own the product and have greater experience and are more competent in the matter". On the question of taxation, the Institute recommends the fixing of a single overall tax on income (this presumably means profits) not to exceed 50 per cent. They consider this necessary to ensure the inflow of new capital, but recognize that immediate Government needs will, in fact, make the application of a higher tax imperative.

LEAD AND ZINC.—As the result of further stockpile buying the prices of both lead and zinc have advanced in the past week, lead by ¼ c. to 14½ c., and zinc by ½ c. to 11½ c. It appears that when the G.S.A. invited offerings of both metals last week insufficient metal came forward at the old prices. The G.S.A. then called for additional offers which led to the price increases.

Some American producers are reported to believe that G.S.A. zinc purchases have, in recent months, been somewhat higher than previously estimated and are now suggesting that stockpile offtake may have been running as high as 20,000 tons per month. It has been officially stated that this month's purchases are part of the normal stockpile programme and that details of the new accelerated programme purchases would be announced in due course. It is thought that there may be a delay of some weeks before this occurs.

Presumably when the announcement is made some further light may be thrown on the President's proposal for bartering surplus agricultural commodities for foreign lead and zinc. Somehow we cannot see this idea developing very far, as the main lead-zinc exporters to the States are countries which themselves have agricultural surpluses.

After starting the year badly galvanized sheet shipments in the States have steadily improved to the point where, for the first seven months of 1954, shipments amounted to 1,335,156 s.tons or less than 1 per cent below the total for the corresponding period last year.

From Yugoslavia it is reported that the Sevojno copper and zinc rolling mill is scheduled to start production shortly. During 1955 the plant will work at about 40 per cent capacity which is about 24,000 tons.

In Copenhagen the Norkisk Mining Company has announced the discovery of a lead-zinc deposit at Mestervig in East Greenland valued at around Kr.100,000,000. Nordisk Mining is controlled partly by the Danish Government and partly by private Swedish, Danish and Canadian interests.

Swedish zinc production is to be raised from about 100,000 to 250,000 tons a year according to the Swedish firm A. B. Zilgruver.

TIN.—The Tin Study Group statistics for the first six months of 1954 confirm previous impressions that the gap between world mine production and consumption narrowed, at any rate temporarily. The half year's figures reveal a gap of about 10,000 tons, equivalent to 20,000 tons in a full year, as against the 40,000 tons gap which occurred in 1953. Smelter output is, however, running at the equivalent of about 20,000 tons per annum above mine output, a fact which tends to obscure the slight but fundamental improvement in the position. It must not be forgotten, however, that the market is still largely being sustained by U.S. Government purchases and there is no reason to suppose that these will continue at their present level once the International Tin Agreement is operative. Consequently, the early imposition of quotas on producing countries seems inevitable.

After being totally closed down during July owing to the exhaustion of stocks from previous Bolivian contracts, the Texas smelter got into its stride again last month with output of 2,002 tons, making a total of 17,584 tons for the first eight months of the year compared with 26,700 tons in the corresponding period of 1953.

ALUMINIUM.—Plans of the West German aluminium producers to increase domestic production of foundry aluminium from 107,000 tons achieved in 1953 to between 125-130,000 tons this year, will raise West Germany to third place among the world's aluminium producers. Production during the first six months of 1954 was recorded at 61,099 tons compared with 49,843 tons last year, and plant capacity is expected to remain fully employed the rest of the year.

MANGANESE.—The Government of India has decided, in the light of transport capacity, that for the period September-December, 1954, the movement of manganese and iron ores to the port of Calcutta should continue to be regulated on a quota basis. Movement of these ores over the Bellary-Hospet-Guntakel (metre gauge) sector for export through the port of Madras will also be regulated in the same manner. But movement of these ores for shipment through the ports of Vishakhapatnam, Masulipatam and Kakinada will not be regulated on a quota basis, wagons on this line being allotted by the railway authorities only to registered exporters, mine-owners and internal dealers. Movement over the metre gauge section of the Bangalore area will be regulated in the same way.

NICKEL.—The Sumitomo Metal Mining Company of Japan is currently negotiating with a West German company for the export of 20 tons of nickel per month over a period of one year, the nickel to be used for making communication equipment. If these negotiations are successful, it will give an alternative source of nickel supply to West Germany which hitherto has relied solely on Canadian nickel for the manufacture of communication apparatus.

Iron and Steel

Official statistics of production suggest that the American steel trade is emerging from the trough of depression. Rising output and rising prices afford unmistakeable evidence of improved conditions on the Continent, and against this background, the outlook for British steel continues to improve. Steel salesmen no longer need to go out and look for business. Order books for many types of steel are full to the end of the year and bookings for the first quarter of 1955 are quite extensive. There are more workers employed in British industry than ever before and the extent of the home demand for steel is also unprecedented. But on less spectacular lines overseas trade is also steadily expanding. So much so, that overseas buyers are now freely paying export premiums for certain products such as sheets and plates.

It is a fortunate circumstance that in the midst of a boom, U.K. capacity has been raised to its highest level and will be further increased before the end of the year. This affords the best assurance that temporary shortages will not get out of hand. Nevertheless, delivery dates are lengthening and buyers are fully alive to the need to issue their specifications well in advance of their requirements.

There is renewed pressure for plates which may necessitate further imports from Austria. Bookings for heavy sections have reached formidable proportions and tube makers have all the work they can handle, whilst exports of wire products are up 100 per cent on last year's figures. Sheet makers have long since exhausted this year's export quotas and subject to the necessary authorization have entered into substantial commitments for the first quarter of next year. Even the re-rollers who were working short time until recently have filled up their order books and are specifying for much bigger tonnages of billets, bars and slabs.

Pig iron production barely meets requirements and in some cases withdrawals from stock have been necessary. The last rise in prices has not, as was feared, restricted the demand for iron castings and the output of high phosphorous iron is fully absorbed. But the heaviest demand is for basic iron for the open hearth steel plants where scrap consumption is also increasing. Good stocks of scrap are in hand, but all the steel works are still open for the acceptance of maximum tonnages.

The London Metal Market

(From Our Metal Exchange Correspondent)

Comparatively little interest has been shown in the tin market and prices have been relatively stable. Consumer demand remains at a satisfactory rate, and should this continue it may cause some tightness in immediate supplies later in the year. The Eastern price on Thursday morning was equivalent to £745½ per ton c.i.f. Europe, and the American market has followed the Singapore quotation with only spasmodic consumer buying.

The feature in the copper market has been the increase in the backwardation, which has been due more to technical reasons than to any increase in demand, but it is not expected that the present span will decrease to any appreciable extent with the present supply shortage. The forward quotation has also risen on news of strikes, or possible strikes, in both the States and Chile, whilst sentiment in general has been influenced by the news from the Far East. It is understood that the Japanese have been offering cathodes in the European market this week, but it is not thought that the tonnage is sufficiently large to cause any alteration in the general price structure.

The lead market has been helped by fairly general buying, and with the majority of supplies already allocated against long-term contracts the amount of physical metal available is hardly sufficient to satisfy the demand, but it is to be expected that at this price level a certain amount of additional tonnage will find its way to the market.

The zinc market has been very active and prices have benefited accordingly. Whilst it cannot be said that the demand for zinc has increased to any appreciable extent, it does appear that a new price level has been established with a low point around £80. Offerings of Russian refined zinc to consumers have had the effect of reducing the premium for this grade to £4 a ton, and in some cases a shade lower.

In the U.S. the lead and zinc prices have both been raised, and thus another step is taken towards obtaining a combined price of 27½ c. per lb., which seems to be the lowest level necessary to satisfy producers and politicians. If this goal is attained we might see lead £2-£3 higher and zinc £5-£6 higher on the London Metal Exchange.

Closing prices and turnovers are given in the following table:—

	September 2		September 9	
	Buyers	*Sellers*	*Buyers*	*Sellers*
Tin				
Cash	£732½	£733	£734½	£735
Three months	£731½	£732½	£734½	£735
Settlement	£733		£735	
Week's turnover	555 tons		665 tons	
Lead				
Current month	£98¾	£99	£100	£100¼
Three months	£97½	£97¾	£99	£99¼
Week's turnover	2,950 tons		3,700 tons	
Zinc				
Current month	£79	£79½	£81	£81½
Three months	£78¾	£79	£80¼	£80¾
Week's turnover	4,375 tons		9,200 tons	
Copper				
Cash	£246	£246½	£246½	£246¾
Three months	£238¼	£238½	£239¼	£239¾
Settlement	£246½		£246¾	
Week's turnover	4,975 tons		5,850 tons	

OTHER LONDON PRICES — SEPTEMBER 9

ANTIMONY

English (99%) delivered, 10 cwt. and over .. .. .. £210 per ton
Crude (70%) .. .. £200 per ton
Ore (60% basis) .. .. 22s./24s. nom. per unit, c.i.f.

NICKEL

99.5% (home trade) .. .. £483 per ton

OTHER METALS

Aluminium, 99.5%, £156 per ton
Bismuth (min. 2 cwt. lots) 16s. lb.
Cadmium (Empire), 12s. lb.
Chromium, 6s. 5d./7s. lb.
Cobalt, 21s. lb.
Gold, 250s. 2d. f.oz.
Iridium, £45 oz. nom.
Magnesium, 2s. 4d. lb.
Manganese Metal (96%-98%) £225/£262
Osmiridium, £40 oz. nom.
Osmium, £50 oz. nom.
Palladium, £7 oz.
Platinum, £30/£31
Rhodium, £42 oz.
Ruthenium, £22 10s. oz.
Quicksilver, £102 10s. ex-warehouse
Selenium, 35s. 9d. nom. per lb.
Silver 73d. f.oz. spot and 72¾d. f'd.
Tellurium, 15s./16s. lb.

ORES, ALLOYS, ETC.

Bismuth .. .. 40% 6s. 3d. lb. c.i.f.
30% 5s. 0d. lb. c.i.f.
Chrome Ore—
Rhodesian Metallurgical (lumpy) £13 12s. per ton c.i.f.
" " (semi-friable) £12 18s. per ton c.i.f.
" Refractory £12 14s. per ton c.i.f.
Magnesite, ground calcined .. £26-£27 d/d
Magnesite, Raw .. .. .. £10 - £11 d/d
Molybdenite (85% basis) .. 102s. 4d.-103s. per unit c.i.f.
Wolfram and Scheelite (65%) .. 177s. 6d. - 185s. per unit c.i.f.
" " " .. U.K. Gov't Stock d/d 195s. per unit inc. charges
Tungsten Metal Powder .. .. 16s. 4d. nom. per lb. (home)
(98% Min. W.)
Ferro-tungsten .. .. .. 13s. 4d. nom. per lb. (home)
Carbide, 4-cwt. lots .. .. £37 6s. 3d. d/d per ton
Ferro-manganese, home .. .. £54 15s. 0d. per ton
Manganese Ore Indian c.i.f. Europe (46%-48%) .. .. .. 68d./70d. per unit nom.
Brass Wire .. .. 2s. 6¾d. per lb. basis
Brass Tubes, solid drawn .. 1s. 11¼d. per lb. basis

THE MINING MARKETS

(By Our Stock Exchange Correspondent)

Stock markets continued active and strong although the big rise of recent weeks was, in most cases, not repeated. Encouragement was received from the sterling area gold and dollar returns. Because of the voluntary repayment of $112,000,000 to the International Monetary Fund there was a deficit of $95,000,000 for August. This meant that apart from special factors there was a surplus for the month whereas usually there is a deficit at this time of year. Later in the week, events in Formosa put a check on the upward movement.

The strength of gold in world markets and the rise in price in London to 250s. 1½d. per oz. helped to sustain interest in Kaffirs and offset much of the reaction that is usually encountered at the close of dealing for an account. Finance houses generally gained ground although here and there a modest setback occurred.

Among individual Rand mines, the monthly returns published last Thursday were the focal point of interest although prices generally suffered a shakeout on Monday. The better profit figures from Randfontein failed to steady the shares which dropped 2s. and disappointment with the results from West Rand Consolidated and Luipaards Vlei caused a setback in these two stocks also. Profit-taking in Western Reefs brought about a sharp slide in the price of the shares. Exceptionally, Doornfontein went ahead strongly. This young producer showed a good improvement in the monthly profit figures despite the fact that the tonnage milled remained unchanged.

Considerably more interest was displayed in the Orange Free State, and although the shakeout was also felt here it failed, in most cases, to do more than slightly to reduce initial gains. Geoffries were a good feature. The shares were well supported due to persistent rumours of a coming flotation. The action by Anglo American Corporation in subscribing for 5,000,000 shares in Loraine at 20s. each caused a big rise in price. Although gold values announced to date from this property are moderate, reports from the Cape suggest that the company may become a high-grade uranium mine. Production is expected to begin next March. Strong rumours of good values caused a jump in Free State Geduld and both the President mines and Welkom were leading features. President Brand have recently been the centre of much favourable comment in the financial press. The initial production figures were well up to the most optimistic expectation at £54,000.

In the West African market, Ashanti were friendless due to the fact that profits for the year to date are still over £100,000 below the comparable figures for last year. The new crushing and profit records set up by Ariston caused another gain in price.

The miscellaneous gold section was very quiet but inquiry for Zambesi Exploring caused the shares to go ahead. Calculations that the break-up value of Ooregum may well exceed the present market price by a fair margin brought in buyers.

Investment buying of Anglo American Trust again took place and Consolidated African Selection Trust were another good feature in the diamond market.

Coppers were a strong market with Bancroft the star turn. At one time, the shares touched 35s. 6d. before reacting. Chartered improved mainly due to the company's large holding of Bancroft shares. No news has been forthcoming to account for this rise. Other prices in this section advanced sharply due to the improved metal price and estimates of another good year's profits.

Both Eastern and Nigerian tin shares were rather mixed but a better tone was noticeable following the improvement in the metal price. Southern Tronoh fell on disappointment with the figures.

Elsewhere, lead and zinc shares failed to respond to the better trend in base metals, but Consolidated Murchison were again bought in the Cape and Central Province Manganese jumped 2s. 6d.

Canadians were influenced by the recovery on Wall Street.

FINANCE	Price Sep. 8	+ or — on week
African & European	3⅛	+1/16
Anglo American Corpn.	8 11/16	+¼
Anglo-French	25/7½	+1/10½
Anglo Transvaal Consol.	31/3	+3/9
Central Mining (£1 shrs.)	42/3	+3d
Consolidated Goldfields	55/-	+1/-
Consol. Mines Selection	43/1½	+7½d
East Rand Consols	3/10½	.....
General Mining	5	+⅛
H.E. Prop. 5/- Shares	12/4½	+1½d
Henderson's Transvaal	8/6	.....
Johnnies	49/3	+6d
Rand Mines	4 1/16	.....
Rand Selection	46/10½	—7½d
Strathmore Consol.	47/6	+3/1½
Union Corp. (2/6 units)	39/6	+1/3
Vereeniging Estates	5⅜	+1/16
Writs	38/9	—1/3
West Wits	45/-	+6d
RAND GOLD		
Blyvoors	34/6	—1/-
Brakpan	8/-	—6d
City Deep	16/3	.....
Consol. Main Reef	20/-	—7½d
Crown	42/6	—1/3
Daggas	70/-	—3/1½
Doornfontein	31/6	+2/6
Durban Deep	31/3	—2/6
E. Daggas	11/9	—9d
E. Geduld .. (4/- units)	29/-	—6d
E. Rand Props	2 17/32	—3/32
Geduld	3⅞	—⅛
Govt. Areas	13/-	—9d
Grootvlei	19/3	—3d
Libanon	11/-	—3d
Luipaards Vlei	22/3	—6d
Marievale	19/3	.....
Modderfontein East	16/3	.....
New Kleinfontein	12/9	.....
New Pioneer	17/-	.....
Randfontein	67/-	—2/-
Robinson Deep	19/3	.....
Rose Deep	13/9	—9d
Simmer & Jack	4/3	—3d
S.A. Lands	23/1½	.....
Springs	3/6	—7½d
Stilfontein	29/3	—6d
Sub Nigel	41/3	.....
Van Dyk	5/-	—6d
Venterspost	12/3	—1½d
Vlakfontein	14/6	+3d
Vogelstruisbult	35/9	—1/3
West Driefontein	6⅜	+1/16
W. Rand Consolidated	51/3	—2/6
Western Reefs	48/9	—3/1½

O.F.S.	Price Sep. 8	+ or — on week
Freddies	8/10½	+10½d
Freddies Consolidated	21/6	.....
F. S. Geduld	6 7/16	+3/16
Geoffries	23/3	+6d
Harmony	40/6	—9d
Loraine	19/3	+4/-
Lydenburg Estates	30/-	—2/6
Merriespruit	12/6	—6d
Middle Wits	18/3	+1/9
Ofsits	83/11½	—2/6
President Brand	80/7½	+3/1½
President Steyn	45/-	+2/9
St. Helena	32/-	—1/-
Virginia Ord.	16/3	—6d
Welkom	31/-	+2/9
Western Holdings	5⅛	—1/16
WEST AFRICAN GOLD		
Amalgamated Banket	1/6	.....
Ariston	6/9	+3d
Ashanti	18/9	—4½d
Bibiani	4/6	—1½d
Bremang	1/7½	—1½d
G.C. Main Reef	3/6	+1½d
Konongo	2/4½	.....
Lyndhurst Deep	10½d	.....
Marlu	1/4½	.....
Taquah & Abosso	2/4½	+1½d
W. Selection & Dev.	6/6	—1½d
AUSTRALIAN GOLD		
Boulder Perseverance	8/10½	+1½d
Gold Mines of Kalgoorlie	15/3	—3d
Great Boulder Prop.	9/-	—6d
Lake View and Star	16/-	+6d
Mount Morgan	18/6	—6d
North Kalgurli	8/6	.....
Sons of Gwalia	5/9	—3d
Western Mining	14/-	+9d
MISCELLANEOUS GOLD		
Cam and Motor	9/3	.....
Champion Reef	4/3	—3d
Falcon Mines	9/1½	—1½d
Globe & Phoenix	24/-	.....
G.F. Rhodesian	7/9	—6d
London & Rhodesian	5/-	+1½d
Motapa	1/9	—3d
Mysore	5/3	—1½d
Nundydroog	6/1½	—4½d
Ooregum	5/1½	+10½d

MISCELLANEOUS GOLD (contd.)	Price Sep. 8	+ or — on week
St. John d'el Rey	15/3	—4½d
Zams	40/-	+2/3
DIAMONDS & PLATINUM		
Anglo American Inv.	7½	+½
Casts	30/-	+2/3
Cons. Diam. of S.W.A.	6½	.....
De Beers Defd. Bearer	6⅛	—1/16
De Beers Pfd. Bearer	18	—½
Pots Platinum	9/3	.....
Watervaal	15/6XD	—3d
COPPER		
Chartered	85/-	+3/3
Esperanza	5/4½	—1½d
Indian Copper	5/6	.....
Messina	4⅞	+⅛
Nchanga	9⅛	+11/16
Rhod. Anglo-American	79/-	+4/3
Rhod. Katanga	11/6	+1/10½
Rhodesian Selection	21/3	+1/6
Rhokana	27⅝	+1⅛
Rio Tinto	37½	+½
Roan Antelope	19/3	—3d
Selection Trust	50/-	.....
Tanks	5⅛	+⅛
Tharsis Sulphur Br.	3 5/16	.....
TIN (Eastern)		
Ayer Hitam	25/9	.....
Gopeng	8/1½	+4½d
Hongkong	7/-	—7½d
Ipoh	16/6	+6d
Kamunting	7/9	+3d
Kepong Dredging	3/9	+3d
Kinta Tin Mines	10/-	.....
Malayan Dredging	26/3XD	—9d
Pahang	10/9	+4½d
Pengkalen	8/7½	+1½d
Petaling	7/7½	+1½d
Rambutan	15/3	—1/3
Siamese Tin	6/10½	.....
Southern Kinta	18/3	+4½d
S. Malayan	24/3XD	—3d
S. Tronoh	8/6	—1/1½
Sungei Kinta	10/6	—3d
Tekka Taiping	4/10½	—1½d
Tronoh	25/-	+6d
TIN (Nigerian and Miscellaneous)		
Amalgamated Tin	15/10½	—1½d
Beralt Tin	23/6	+3d
Bisichi	6/6	.....
British Tin Inv.	16/1½	+7½d
Ex-Lands Nigeria	3/3	.....

TIN (Nigerian and Miscellaneous) contd.	Price Sep. 8	+ or — on week
Geevor Tin	12/9	.....
Gold & Base Metal	3/3	.....
Jantar Nigeria	9/-	+1½d
Jos Tin Area	13/6	.....
Kaduna Prospectors	2/3	.....
Kaduna Syndicate	2/4½	—1½d
London Tin	6/1½	.....
United Tin	3/3	.....
SILVER, LEAD, ZINC		
Broken Hill South	51/9	—9d
Burma Mines	2/3	.....
Consol. Zinc	37/3	—3d
Lake George	6/6	—6d
Mount Isa	43/-XD	+3d
New Broken Hill	27/3	—9d
North Broken Hill	66/9	.....
Rhodesian Broken Hill	11/4½	+1½d
San Francisco Mines	19/6	+9d
Uruwira	4/6	+6d
MISCELLANEOUS		
BASE METALS & COAL		
Amal. Collieries of S.A.	46/-	.....
Associated Manganese	44/6	—1/3
Cape Asbestos	25/7½	—1½d
C.P. Manganese	43/6	+2/3
Consol. Murchison	3 1/16	+1/16
Mashaba	3d	.....
Natal Navigation	3	.....
Rhod. Monteleo	1/3	.....
Turner & Newall	88/-	—9d
Wankie	14/4½	.....
Witbank Colliery	4½XD	.....
CANADIAN MINES		
Dome	$29½	.....
Hollinger	$33	+¼
Hudson Bay Mining	$88	+3
International Nickel	$86½	+4½
Mining Corpn. of Canada	£5 7/16	+1/16
Noranda	$139	+2
Quemont	£7¾	+⅛
Yukon	3/6	—1½d
OIL		
Anglo-Iranian	15½	+1/16
Apex	25/9	—6d
Attock	46/10½	—7½d
Burmah	92/6	—7½d
Canadian Eagle	31/9	—3d
Mexican Eagle	19/1½	—1½d
Shell (bearer)	5⅛	—1/16
Trinidad Leasehold	25/6	+6d
T.P.D.	22/9	—1/-
Ultramar	27/4½	—4½d

COMPANY NEWS AND VIEWS

Mufulira and Roan Expand Profits in June Quarter

The June quarterly reports of Mufulira and Roan Antelope Copper Mines, published at the beginning of this week, make interesting reading. Copper sales and revenue of both companies for the June three months shows a big increase and undoubtedly reflects a clearing of the accumulated supplies in the "pipelines" which had to be re-established following the reversion of the U.K. copper market to free dealings.

Mufulira's copper production for the year ended June 30 last received a good boost from the latest returns and the end-year figure of 87,972 l.tons shows an increase of 11,883 l.tons over the preceding year. Revenue from the sale of 84,467 l.tons of blister and electrolytic copper was higher by 11,725 l.tons and the year's estimated profits indicate an expansion in earnings by £1,190,000 to £8,765,000. Roan's copper production was up by 1,371 l.tons at 88,678 l.tons, but sales of blister copper declined by 2,601 l.tons at 84,706 l.tons and estimated profits fell by over £1,300,000 to £8,138,000.

These results, which must be considered as highly satisfactory, may be even better in the current year. The copper price for the past two months has been several points higher than the £230 per ton average ruling to the year ended June 30 last and this week it reached its highest price since last April. This increase in selling price should be particularly useful to Roan Antelope whose working costs increased by approximately £15 per ton to £125 per ton. Roan will, in any event, have the benefit from its electrolytic refinery when completed in due course, as this will enable the company to produce a more easily marketable product at a relatively higher price. Costs at Mufulira rose by about £8 per ton to £115 per ton.

	1953 Sept. Qtr.	*1953 Dec. Qtr.*	*1954 Mar. Qtr.*	*1954 June Qtr.*
Mufulira				
Sales (l.tons) ...	10,272	18,133	23,664	32,398
	(£000)	(£000)	(£000)	(£000)
Revenue	2,527	4,079	5,307	7,496
Costs	2,000	2,875	2,061	3,229
Difference in value of copper stocks	Cr. 752	Cr. 732	Dr. 735	Dr. 387
Surplus	1,279	1,936	2,511	3,880
London Expenses ...	Nil	Nil	Nil	Nil
Replacement* ...	205	216	211	209
Profit before taxation†	1,074	1,720	2,300	3,671
Roan Antelope				
Sales (l.tons) ...	12,971	14,749	24,744	32,242
	(£000)	(£000)	(£000)	(£000)
Revenue	3,152	3,337	5,536	7,455
Costs	2,638	2,866	2,707	2,940
Difference in value of copper stocks	Cr. 1,054	Cr. 1,010	Dr. 328	Dr. 1,166
Surplus	1,568	1,481	2,501	3,349
London Expenses ...	Nil	Nil	Nil	Nil
Replacements* ...	183	198	190	190
Profit before taxation†	1,385	1,283	2,311	3,159

* Subject to revision when year's accounts considered. † Estimated.

Southern Tronoh's Difficulties

The fall in tin prices together with serious operating difficulties combined to make the year to December 31, 1953, an extremely difficult one for Southern Tronoh Tin Dredging. Consequently, the company incurred a loss which was, however, to some extent offset by a tax refund of £62,937, the balance being met from the unappropriated profit balance.

Year to Dec. 31	*Total Revenue*	*Expenses**	*Taxation*	*Net Profit*	*Dividends*	*Carry Forward*
	£	£	£	£	£	£
1953	103,392	225,443	8,115	L130,166†	NIL	25,583
1952	403,307	243,754	105,617	53,936	52,500	91,791

* Mining costs (including replacing of pontoon and repairs dredge No. 1) £211,128 (1952 — £207,523).
† Before rehabilitation expenses written off of £3,271 (1952 — NIL).
L Loss.

That the company's output of tin concentrates was only a fraction of that of the preceding year is not surprising, for apart from the fact that No. 1 dredge was shut down for conversion to electricity and replating of the pontoon from the beginning of the year until September 4, 1953, when production by this dredge did start again, the company's second dredge was also seriously hindered by the nature of the ground.

Since the close of the financial year much headway has been made towards reaching an economic level of production and figures in respect of the first six months of the current year show production at 427¼ tons against 88½ tons previously.

British Burma's S.A. Subsidiary Pays Dividend

Since the last war when the Burma-based assets of the British Burma Petroleum Company suffered seriously from the "scorched earth" policy pursued to deprive the Japanese of oil supplies, the company has built up a prosperous subsidiary in South Africa. Indeed, it is this company's good results which now enables the parent company to return to the dividend list after a lapse of about 14 years.

Year to Mar. 31	*Total Revenue*	*Expenses etc.*	*Taxation*	*Net Profit†*	*Dividend*	*Carry Forward**
	£	£	£	£	£	£
1954	86,479	33,019	6,002	42,247	37,500	104,479
1953	82,402	36,057	3,342	43,888	NIL	241,253

* After provision for diminution in value of investments of £150,000 (1953 — £138,737).
† Not including £184,829 in respect of 5½ per cent Debenture Stocks redemption sinking fund.

A dividend of 5 per cent was accordingly paid on the company's issued ordinary capital of £750,000 in shares of 4s.

Rand and O.F.S. August Mine Returns

Company	*August, 1954* Tons (000)	Yield (oz.)	Profit (£000)	*Yr. ends*	*Current Financial Year Total to date* Tons (000)	Yield (oz.)	Profit (£000)	*Last Financial Year Total to date* Tons (000)	Yield (oz.)	Profit (£000)
Gold Fields										
Doornfontein ..	50	16,751	83·5	J	100	33,001	161·4	—	—	—
Libanon	95	20,020	50·4	J	192	40,150	100·7	168	33,964	84·7
Luipaards Vlei	109	21,520	43·4	J	219	43,258	88·8	216	40,054	87·2
Rietfontein	27	6,156	23·3	D	221	49,738	190·5	213	47,593	202·3
Robinson	104	21,133	30·0	D	790	185,324	197·1	783	151,557	104·4
Simmer & Jack .	124	20,089	14·7	D	1007	162,294	91·2	973	157,831	101·8
Sub Nigel	66	21,945	94·2	J	133	43,857	189·5	133	44,389	206·9
Venterspost ...	106	26,160	61·0	J	214	52,388	121·8	208	48,724	111·6
Vlakfontein ...	39	14,099	72·1	D	308	110,019	568·3	292	106,288	568·6
Vogels	103	26,162	111·3	D	819	207,403	869·8	773	195,622	783·6
West Drie	51	38,638	301·5	J	103	77,608	605·0	87	59,838	483·6
Anglo American										
Brakpan	110	18,397	12·1	D	885	149,102	106·5	918	164,341	176·3
Daggas	230	52,992	325·7	D	1771	411,305	2526·2	1756	414,181	2668·1
East Daggas ...	94	15,915	46·4	D	746	126,682	369·4	724	126,037	387·1
President Steyn	50	15,623	50·0	D	205	56,692	103·3	—	—	—
S.A. Lands	102	18,970	55·9	D	801	147,485	431·7	800	145,746	409·4
Springs	129	17,934	7·3	D	1035	144,869	60·5	1181	162,577	85·1
Welkom	78	15,631	11·0	D	568	112,940	32·9	496	97,117	107·3
Western Hdgs.*	51	19,462	100·1	D	374	128,911	473·7	70	18,063	15·0
West. Reef Ex..	118	22,869	64·8	D	922	181,567	519·8	868	178,098	643·3
Central Mining										
Blyvoor	109	62,142	481·2	J	220	125,345	974·5	206	122,063	1014·6
City Deep	170	32,111	14·6	D	1314	250,333	131·0	1272	246,158	178·0
Cons. M.R.	186	25,764	30·6	J	375	51,925	65·1	352	48,253	39·4
Crown	314	48,260	53·0	D	2283	360,898	394·4	2144	341,820	311·1
D. Roodepoort	189	30,884	52·1	D	1417	234,564	363·0	1428	241,171	531·4
East Rand Prop.	220	49,441	136·5	D	1617	365,994	975·2	1512	332,880	865·7
Modder B.	59	5,924	2·6	D	453	47,309	20·6	436	46,417	12·6
Modder East ..	117	13,403	12·7	J	238	27,192	23·7	242	27,207	32·5
Rose Deep	75	10,989	11·2	D	567	86,086	95·7	588	87 244	64·3
Welgedacht ...	32	3,847	1·7	J	65	7,815	3·4	68	8,571	7·5
J.C.I.*										
E. Champ d'Or.	20	1,853†	5·0†	D	184	17,958†	52·4†	194	31,120†	6·7†
Freddies Cons..	91	15,622	L18·5	D	613	104,312	L153·5	108	17,580	L81·7
Govt. G.M.A. .	265	35,765‡	33·1‡	D	2082	271,441‡	245·5‡	1954	266,497	440·6
Randfontein ..	306	36,230†	55·2†	D	2311	302,763†	203·0†	2453	313,905†	217·0†
Union										
East Geduld ...	144	44,286	324·8	D	1084	333,319	2431·0	1089	326,699	2433·7
Geduld Prop...	96	15,612	33·1	D	738	120,239	217·5	763	120,703	258·4
Grootvlei	182	39,124	215·1	D	1439	306,660	1710·0	1478	315,133	1854·9
Marievale	69	17,628	81·3	D	521	132,687	582·7	500	122,244	530·9
St. Helena	91	20,475	63·8	D	653	144,654	421·1	507	101,304	166·0
Van Dyk	79	13,414	1·3	D	629	108,510	14·1	705	113,866	6·2
General Mining										
S. Roodepoort .	27	5,919	20·3	J	56	12,061	41·3	56	12,149	40·9
W. Rand Cons.	240	31,257	206·2§	D	1811	227,304	1483·1	1793	250,788	715·8
Anglo Transvaal										
N. Klerksdorp .	12	1,262	L2·5	D	90	6,686	L11·3	83	11,371	6·7
Rand Leases ..	186	31,247	42·9	J	370	62,160	83·0	322	55,146	26·5
Village M.R. ..	35	5,232	10·8	J	70	10,492	22·3	68	10,639	24·0
Others										
Ellaton Gd. Mng	28	9,779	59·4	D	211	61,646	289·5	—	—	—
N. Kleinfontein	109	13,546	13·1	D	862	107,282	118·8	856	110,7†	210·0
Nigel Gold Min	29	4,570	8·3	D	223	34,564	7·3	252	35,428	L7·9
Spaarwater	11	2,771	0·7	D	85	21,413	1·8	83	19,401	L26·0
Stilfontein.....	86	32,247	203·6	D	656	222,733	1287·8	501	144,831	705·7
W. Nigel	17	3,914	9·3	J	35	7,800	18·8	34	7,870	14·3

* Production commenced July 1953 † Gold and Uranium ‡ Gold and Pyrite
§ Profit includes £190,000 from uranium sales L indicates Loss.

Tronoh Increases Production

In confirmation of the chairman of Tronoh Mines, Mr. J. H. Rich's forecast, total production of tin ore achieved by the company during the year to December 31, 1953, was substantially increased. And although the effect of the sharp fall in the price of tin during the year 1953 could obviously not be offset completely by stepping up productivity, the level of earnings achieved by the company during the year calls for particularly favourable comment.

Year to Dec. 31	*Total Revenue*	*Taxation*	*Net Profit**	*Dividends*	*To Reserve*	*Carry Forward†*
	£	£	£	£	£	£
1953	1,011,286	251,649	233,104	130,500	113,956	271,870
1952	1,213,614	421,293	303,780	205,875	90,000	296,334

* After charges including mining costs of £465,555 (1952 — £462,496).
† After rehabilitation expenses written off of £13,112 (1952 — NIL).

Dividends amounting to 80 per cent per ordinary 5s. share on the company's issued capital of £300,000 paid in respect of the year compared with 130 per cent previously. The amount received, taken into the company's account by way of dividends and interest, declined slightly from the previous year's figure and at £98,181 compared with £130,525. Quoted investments shown on the balance sheet at £414,105 had a market value as at December 31, 1953, of £569,206. This does not, however, include the company's wholly-owned subsidiary, Tin Lay Limited, which during the year earned a total revenue of £80,048 as against £134,084 previously, but made a net loss of £15,336 against a previous profit of £46,884.

Year to Dec. 31	*Output (tons conc.)*	*Per cubic yard yield (lb.)*	*price (pence)*	*Per ton ore price rec'd. (£)*
1953	1,982	.55	12.85	431
1952	1,713	.61	15.3	650

During the first six months of the current financial year, during which time the price of tin has made a substantial recovery from last year's low levels, a sharp increase in production has been made by the company with 1,491½ tons of tin ore recovered compared with 916¾ in the preceding period.

INDIAN COPPER CORPORATION LTD.

The Thirtieth Annual General Meeting of the Indian Copper Corporation, Limited, was held on September 8, at the Royal Exchange Hall, Royal Exchange, Calcutta.

The following is the address by the Chairman, **Mr. K. R. Fettes,** which was circulated with the report and accounts for the year ended December 31 last:

This year it has been possible for us to hold the Annual General Meeting considerably earlier than in recent years and I trust we will be able to maintain, if not improve upon, this in the future.

ACCOUNTS

The same high standard of maintenance of the Company's properties has continued and adequate depreciation has been provided in the Accounts.

The profit for the year, before providing for taxation and depreciation, amounted to £410,982 as compared with £687,180 for 1952, the substantial decrease being largely due to the strike to which I refer later. Owing to the reduction in profits it has been necessary to curtail the allocation to General Reserve and also to recommend a lower rate of dividend on this occasion, but provided there is no further labour trouble and world copper prices are maintained, the result for the current year will, we hope, show an improvement.

As you will observe, there has been a further satisfactory reduction in Stocks which at December 31, 1953, stood at £500,293 as compared with £810,982 a year previously. Sundry Debtors are also lower by £265,200 and as a result of these two factors the liquid cash position has improved considerably and current liabilities have been reduced.

COPPER LEASES—OPERATING RESULTS

A detailed review of the year's operations is given in your General Manager's Report, which can be seen during office hours at the Company's Head Office.

The main items are briefly summarized in the Directors' Report. The production results and despatches, if due allowance is made for the loss sustained during the strike period, show an increase over the previous year. Although still far from normal, the Rolling Mill monthly production improved.

DEVELOPMENT

The total footage developed, the copper content, and the average stoping width, all show a decrease. During the year, lateral development was restricted in order to concentrate on the more important development of the mine in depth.

ORE RESERVES

As mentioned in the Chairman's address last year, further ore reserves will only be opened up by the general deepening of the Mine, a process now being followed and entailing continual ploughing back of profits for Capital expenditure.

The main development at Badia was around the 9th and 10th Levels, the results of which continue to be disappointing.

As indicated to you in last year's Report, the reserves of payable ore at Dhobani having become exhausted, the Mine was closed down during the course of the year.

It is necessary for me to draw your attention to the growing cost of production as the Mine deepens and wages increase, and this, together with the decline in the price of copper, may make it necessary in future to revise the basis of estimating the ore reserves. The reserves of payable ore are calculated with a certain minimum copper content, and it appears likely that, unless favourable circumstances intervene during the current year, the minimum will have to be raised, thus reducing the total payable reserves of ore.

SALES

Consequent upon the re-opening of the London Metal Exchange for Zinc and Copper during the year, falls in the price of both metals took place. The average selling prices during the year of the Company's products were:

Copper Ingots	£222 per ton
Rolled Brass	£228 „ „
Yellow Metal Circles	£241 „ „
Rolled Copper	£251 „ „
Copper Circles	£250 „ „

KYANITE

Despatches decreased by 5,650 tons as compared with the previous year. The Government of India restricted the Company's Export Quota to 7,627 tons as compared with 17,161 tons in the previous year, and this accounted for the decrease in despatches.

The export prices throughout the year were maintained at approximately £20 per ton.

LABOUR

The struggle for leadership between the two rival INTUC Unions at the Mines and the Works culminated in a strike at the Works which lasted for over three months from February 28, 1953, thus causing hardship to the workers and considerable financial loss to the Corporation. All production and despatches were suspended during this period, and the reduced output and higher costs to which reference has been made in the Directors' Report, are a direct reflection of this regrettable episode. Work was resumed after the intervention of the Chief Labour Commissioner, Central Government, but even after resumption of work, there were further numerous incidents and cases of refusal to carry out reasonable orders. At the Mines, the demands of the new Union were submitted to Adjudication and the Award was published at the end of the year.

TAXATION

Now that control of the Corporation has been transferred to India the profits are not subject to taxation in the United Kingdom except to a very small extent on interest earned on current accounts which we have to maintain there. The present system of taxing the profits of non-bedded mining Companies in India such as the Corporation, is, however, unsatisfactory. No allowance is granted to compensate for the wasting nature of the mines in which much capital has been sunk, and no special provision is made to enable such Companies to accumulate the funds which are essential if development of the mines is to go on, and the reserves of ore are to be replenished. Out of such profits as remain, therefore, after tax has been paid, a very substantial portion has to be set aside each year to provide the funds required to enable the Company to continue its mining operations. In other countries the special circumstances applicable to non-bedded mining have been recognized and suitable provision has been made in their tax laws. We were recently given the opportunity of placing the facts before the Income Tax Enquiry Commission and it is to be hoped that in the not too distant future similar provisions will be introduced in India.

STAFF

I would like to express my appreciation of the willing co-operation of the Staff both at the Mines and the Works during the year under review, which has been a particularly trying one.

The report and accounts were adopted.

GEEVOR TIN MINES

MR. G. W. SIMMS'S REVIEW

The forty-first annual general meeting of Geevor Tin Mines, Ltd., was held on September 8 in London.

Mr. G. W. Simms (the chairman) presided, and the following is an extract from his statement for the year ended March 31, 1954:—

The operating profit amounted to £53,074, against £115,426 last year, and with £9,555 balance of profit brought forward there is available a total of £62,629, out of which the Directors recommend the payment of a dividend of 1s. 9d. per stock unit, less income tax.

Mining Operations.—57,445 tons of ore were extracted from the mine, from which 2,460 tons of waste was sorted, leaving 54,985 tons for the Mill ore bins. Of this, 54,930 tons were milled, yielding 682.34 tons of black tin (65 per cent Sn), which represents an average recovery of 27.82 lb. of black tin per ton of ore milled. This figure is 3.39 lbs. per ton higher than that of the previous year.

Ore Reserves.—At the end of the financial year stood at 180,837 tons, which is almost identical with the figure for the previous year, though the grade is slightly lower.

When considering the future of this Company and of the Cornish Tin Mining Industry generally, one is at once confronted with the question of the penal nature of mine taxation in the United Kingdom. For many years those within the Industry have consistently drawn the attention of H.M. Government to the inevitable outcome of its mine taxation policy, but with meagre results, for the concessions recently made, though helpful, still fail adequately to recognise the high risk nature of this Industry, operating as it does under difficult conditions upon a wasting asset. Now that only two tin mines remain at work in Cornwall is it too much to ask Government whether or no it desires the Tin Industry here to survive? It should be obvious that however great the concession in regard to taxation of tin mines operating in the United Kingdom it would cost Government very little, while it stands to gain much from the ancillary benefits which would accrue as a result of the Industry's revival. The remedy is simple—Countries which desire to foster mining have already found it.

The report was adopted.

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ASSISTANT MANAGERS are required for two alluvial diamond mining Companies operating in British West Africa. Applicants must possess a degree or diploma in mining and/or a first class colliery manager's certificate and/or mine manager's certificate of the South African Chamber of Mines. They must have had experience in production engineering and T.W.I. methods.

Commencing salary is dependent on experience and qualifications, but would be within the range of £2,500 to £2,750 per annum for a single man. A married man would receive £180 per annum in addition to the above. Twelve weeks' leave on full pay after every twelve months' service, with free first class return passages. Contributory pension scheme, free life assurance and provident fund and yearly cash bonuses are on a sliding scale based on profits. Free furnished bungalow accommodation and free medical services. Wife may accompany husband, and children allowed up to the age of 6 years.

Applicants should submit full details of age, training and experience, and whether married or single, to Box A.492, c/o Central News, Ltd., 17 Moorgate, London, E.C.2.

A large mining company operating in Upper Burma, climate sub-tropical and healthy, has a vacancy for:—

MINING ENGINEER. A graduate of a recognized School of Mines with previous experience essential. Basic salary K.885 (£66 7s. 6d.) monthly, rising by annual increments of K.50 (£3 15s. 0d.) monthly to a maximum of K.1,035 (£77 12s. 6d.) monthly for the fourth year, plus following allowances:—

Fixed Overseas Pay	K.150	=	£11 5s. 0d.
Variable Overseas Pay	K.150	=	£11 5s. 0d.
Variable Cost of Living Allowance	K.225	=	£16 17s. 6d.

Commencing emoluments thus aggregate K.1,410 (£105 15s. 0d.) monthly rising to K.1,560 (£117 0s. 0d.) monthly in the fourth year.

Four years agreement: six months leave on full basic pay at the end of four years, but consideration given to advance interim leave of three months after eighteen months' service. Passage out and home. Partly furnished quarters and medical attention free. The company contributes one month's basic salary per annum to a Provident Fund and employee makes similar contribution.

Write Box G.788, Willing's, 362 Gray's Inn Road, London, W.C.1., with full details, experience, references and family.

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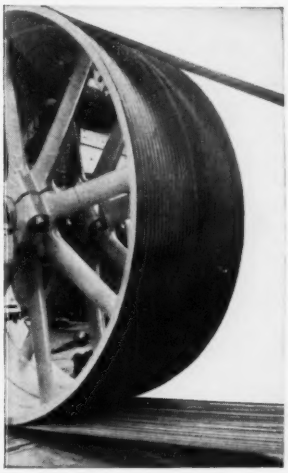

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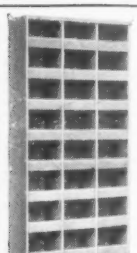

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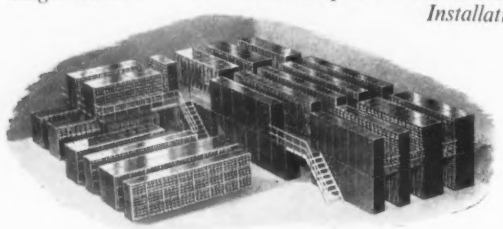

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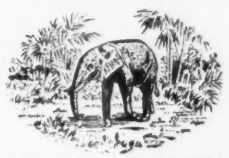

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